



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

## XV.

## CONTRIBUTIONS TO AMERICAN BOTANY.

BY SERENO WATSON.

Presented May 14, 1879.

I. *Revision of the North American Liliaceæ.*

THE order *Liliaceæ*, as outlined by Dr. Gray in the last edition of his Manual (1867), and as now generally understood by botanists, presents such a diversity in its characters and their combinations that it is by no means easy to satisfactorily group the genera according to their affinities, or to arrange them in any seemingly natural sequence or sequences. The difficulty is not much diminished, but rather increased, when the question is confined to the genera of a limited geographical area; hence, in the following attempt at a classification of the fifty genera that are found in North America, their relations to the rest of the order have been in some measure taken into account.

If the character of a baccate as distinguished from a capsular fruit be considered a subordinate one (as seems to be necessary), a division of the genera may be made into three series or suborders, which, notwithstanding exceptions, are on the whole pretty clearly defined. The first and largest of these is prominently distinguished by its scarious floral bracts, persistent nerved perianth, perigynous stamens with introrse anthers, an undivided persistent style, and a loculicidal fruit (if capsular). This includes much the larger portion of the genera which have usually been considered as belonging to the capsular *Liliaceæ*, as well as most of the *Asparagineæ*. Both of the other divisions have the stamens hypogynous or nearly so, with more or less extrorse anthers, and the floral bracts are more or less foliaceous or are wanting. Both also always have distinct perianth-segments and unjointed pedicels. But one has a nerveless deciduous perianth, the styles (when present) more or less united, and the fruit a loculicidal capsule or a berry; to this belong the *Liliæ* or *Tulipeæ* proper, the *Uvulariæ* and the *Trilliacæ*, as here defined, and a few other

genera. The other division, corresponding nearly to the old order *Melanthaceæ*, has distinct styles and a septicidal capsule conjoined with a persistent nerved perianth.

The subdivision into tribes is here based upon the characters of the inflorescence, and such others as can be used without separating evidently allied genera, to avoid which it is sometimes found necessary to lay little stress either upon the degree of union of the segments of the perianth or upon root-characters. The grade of the tribes is equalized so far as possible by reducing the less positively marked groups to the rank of subtribes, though some isolated genera are still left, which refused to be so degraded. As respects the citation of authorities under the specific descriptions, only the more important synonyms and figures are usually referred to. Much indebtedness is acknowledged to the recent revisions of various portions of the order by Mr. J. G. Baker of Kew, although his conclusions are not in every case adopted. It is a source of regret that his last paper upon the "*Colchicaceæ*" has not yet been issued, and that the present article, which has been delayed for some time with the hope of benefiting by it, must be completed without such assistance.

**SERIES I.** Floral bracts present and more or less scarious. Perianth persistent; segments 1-several-nerved. Stamens perigynous; anthers introrse. Style undivided, persistent. Capsule loculicidally dehiscent. Seeds more or less turgid, ascending, with close black testa. Leaves with approximate longitudinal nerves and transverse veinlets. Pedicels often jointed.

*Exceptions.* Style and perianth deciduous in *Odontostomum*. Style deciduous in *Chlorogalum* and *Hesperaloe*; sometimes wanting and capsule sometimes baccate or septicidal in *Yucca*. Fruit baccate or indehiscent, with light-colored seeds, in *Convallariæ* and *Nolineæ*. Seeds dark brown in *Odontostomum*; horizontally flattened in *Hesperocallis* and *Yuccæ*.

**SUBSERIES I.** Inflorescence umbellate, upon a naked scape arising from a corm or bulb; sessile upon a short rootstock in *Leucocrinum*.

**TRIBE I. Alliæ.** Bracts (usually 2) broad and spathaceous: capsule more or less deeply lobed, the filiform style jointed upon the axis: seeds one to several in each cell, angular or subovate: perianth cleft nearly to the base; segments 1-nerved: pedicels not jointed: bulb mostly tunicated.

1. **ALLIUM.** Flowers deep rose-color to white. Capsule subglobose or obovate, deeply lobed and often crested: base of the style enclosed between the lobes and jointed upon the short axis: cells 1-2-ovuled at the base. Filaments usually dilated at base. Bracts 2 to 4. Leaves one to several. Scape from a tunicated bulb (sometimes rhizomatous) or rarely a coated corm. Taste and odor strongly alliaceous. — In our species the sheaths of the

leaves rarely extend at all above ground, the bracts are never elongated, and the filaments are without cusps or teeth, the bases united into an adnate disk (except in *A. tricoccum*).

2. **NOTHOSCORDUM.** Flowers greenish or yellowish white. Capsule oblong-obovate, somewhat lobed, obtuse, with the style obscurely jointed on the summit; cells several-ovuled. Filaments filiform, distinct, adnate at base. Bracts 2. Leaves several. Bulb tunicated: not alliaceous.

**TRIBE II. Milleæ.** Bracts several, not spathaceous, distinct: capsule not lobed (or slightly so), acute, and beaked by the mostly stout (at length splitting) style: seeds few to several in each cell, angular: perianth-segments more or less united or distinct, 1-nerved or rarely closely 2-3-nerved: scape from a membranous- or fibrous-coated corm.

\* Perianth parted to the base or nearly so; segments spreading, closely 2-3-nerved: stamens in one row at the base; anthers versatile: capsule obovate or subglobose, sessile or nearly so; cells several-seeded.

3. **MULLA.** Flowers greenish-white. Filaments filiform, naked, adnate at base. Pedicels not jointed. Leaves several.
4. **BLOOMERIA.** Flowers yellow, on jointed pedicels. Filaments elongated, free, surrounded at base by a somewhat cup-shaped and winged appendage. Leaf solitary.

\* \* Perianth evidently gamophyllous, with the stamens on the throat.

+ Perianth funnel-form; segments 1-nerved (very rarely 2-3-nerved in *Brodiaea*): pedicels jointed (except in *Androstephium*).

5. **BRODLÆA.** Perianth more or less narrowly funnel-form, not contracted at the throat, nor saccate or but very slightly so at base, blue-purple or white or yellow. Stamens 6, in one or two rows with winged or naked filaments, or 3 and alternate with as many staminodia. Capsule ovate to oblong.
6. **STROPHOLIRION.** Flowers rose-colored, the short broadly turbinate tube 6-saccate, contracted at the throat, about equalling the spreading limb. Stamens 3, alternate with 3 ligulate staminodia; filaments winged; anthers basifixed. Capsule nearly sessile, ovate, acuminate.
7. **BREVOORTIA.** Perianth-tube broad, 6-saccate at base, deep scarlet, several times longer than the short erect or reflexed yellowish limb. Stamens 3, alternate with 3 broad truncate staminodia; anthers basifixed, nearly sessile. Capsule long-stipitate, ovate, acuminate.
8. **ANDROSTEPHIUM.** Flowers pale lilac, the cylindrical tube about equalling or shorter than the somewhat spreading limb. Stamens 6, in one row; the filaments united to form an erect tubular



crown, with bifid lobes alternate with the oblong versatile anthers. Capsule sessile, subglobose-triquetrous. Seeds large.

+ + Perianth salver-form; segments 3-nerved; pedicels not jointed.

9. **MILLA**. Flowers white, greenish outside with stout green midveins, the tube narrowly turbinate. Stamens nearly sessile, in one row, naked: anthers basifixed. Capsule sessile, oblong-obovate.

**TRIBE III. Leucocrineæ**. Acaulescent; flowers on subterranean pedicels in a sessile umbel, with elongated linear bracts, from a short rootstock: perianth salver-form, with linear tube and several-nerved segments: stamens in one row near the throat; anthers basifixed: capsule sessile, triangular-obovate; seeds obovate, angled, several in each cell.

10. **LEUCOCRINUM**. Flowers white, very fragrant. Filaments filiform; anthers linear. Style slender and elongated, tubular, dilated at the summit. Leaves narrowly linear, surrounded at base by scarious bracts. Floral bracts sheathing the pedicels.

**SUBSERIES II.** Inflorescence racemose or paniculate.

**TRIBE IV. Phalangieæ**. Flowers mostly small, with distinct segments, on jointed naked pedicels with small bracts, in simple or usually paniculate racemes: stem somewhat leafy or naked, from a tunicated bulb or rootstock or fleshy-fibrous root: anthers versatile.

\* Capsule obovate or oblong: seeds angled, several in each cell: flowers rather large, racemose on a naked scape from a tunicated bulb.

11. **CAMASSIA**. Flowers blue (rarely white), slightly gibbous; segments 3-7-nerved, spreading. Base of the style persistent. Seeds black and shining. Raceme open. Leaves linear, flat.

\*\* Capsule oblong; cells several-seeded: seeds angular and somewhat flattened: pedicels (usually fascicled) jointed near the middle: root fleshy-fibrous.

12. **HESPERANTHES**. Flowers yellow or yellowish; segments spreading from the base, 3-5-nerved in the middle, twice longer than the stamens, at length twisted over the ovary. Filaments muricate, longer than the anthers. Style elongated and very slender, becoming declinate. Leaves narrowly linear and grass-like, surrounded at base by the fibrous remnants of older ones. — *Anthericum*, subgen. *Hesperanthes*, Baker, Journ. Linn. Soc. 15. 317.

\*\*\* Capsule triangular-obovate, 3-lobed; cells (2-ovuled) 1-2-seeded: seeds obovate: pedicels (mostly solitary) jointed at the summit: stem from a tunicated bulb or rootstock. — Subtribe **CHLOROGALEÆ**.

13. **SCHÆNOLIRION**. Flowers yellow or whitish, in loose simple or sparingly paniced racemes, the perianth not scarious nor becoming connivent or twisted over the ovary; segments distinctly

- 3-5-nerved, exceeding the stamens. Style short. Capsule depressed globose, deeply-lobed. Seeds subglobose, shining. Stem naked, scaly and thickened at base, from a thick rootstock. Leaves rather rigid, few-nerved, very narrow, flat. Pedicels slender, exceeding the flowers and bracts. Atlantic States.
14. **HASTINGSIA.** Flowers white or greenish, in densely many-flowered sparingly paniced racemes, the perianth lax and scarious; segments closely 3- (apparently 1-) nerved, equalling the stamens. Style short. Ovary oblong-ovate, not deeply lobed. Stem naked or sparingly leafy, from a tunicated bulb. Leaves broader and more fleshy. Pedicels stout, much shorter than the flower and bract. California.
15. **CHLOROGALUM.** Flowers white or pinkish, in loose paniculate racemes; perianth at length twisted over the ovary; segments distinctly 3-nerved. Style long, deciduous. Seeds blackish, somewhat rugose. Bulbs with membranous or densely fibrous coats. Leaves with undulate margins. California.

**TRIBE V. Odontostomeæ.** Flowers small, on solitary bracteolate not jointed pedicels in an open panicle; the stem leafy at base, from a fibrous-coated corm: perianth salver-form, deciduous: stamens on the throat; anthers subglobose, basifixed, dehiscent at the summit: style deciduous.

16. **ODONTOSTOMUM.** Flowers yellowish, the cylindrical 12-nerved tube about equalling the at length reflexed 5-nerved segments. Stamens very short, alternating with as many small linear staminodia. Capsule triangular-obovate, 3-lobed; cells (2-ovuled) 1-seeded. Seeds obovate, with dark brown testa. California.

**TRIBE VI. Convallariæ.** Flowers on jointed pedicels in terminal racemes or racemose panicles or in axillary fascicles, upon leafy simple stems (or a naked scape in *Convallaria*) from creeping rootstocks: perianth 6-cleft or of 4 or 6 distinct 1-nerved small glandless segments: style short, usually somewhat persistent; stigma slightly lobed: fruit a globose berry: seeds 1 to several in each cell, ascending or horizontal, subglobose, with close thin testa. Stem naked below (scarious-sheathed at base): leaves cordate to lanceolate.

\* Perianth gamophyllous, campanulate or cylindrical, at length deciduous.

17. **CONVALLARIA.** Acaulescent. Flowers white, campanulate, cleft to the middle, on recurved pedicels with small lanceolate bracts, in a simple one-sided raceme upon a slender curved scape. Stamens near the base; anthers ovate-oblong, sub-basifixed. Style stout, persistent; stigma triangular: ovules 2 or 3 pairs in each cell. Berries red, usually 6-seeded. Leaves 2 or 3, the long petioles convolute and stem-like.

18. **POLYGONATUM.** Flowers white or greenish, cylindric, 6-lobed at the summit, on mostly naked pedicels in axillary pedunculate fascicles (sometimes solitary). Stamens on the tube; anthers linear-oblong, versatile. Style slender, deciduous; stigma obscurely 3-lobed. Ovules 1 to 3 pairs in each cell. Berry blue or black; cells 1-2-seeded. Stem erect or curved; leaves sessile or nearly so; bracts caducous, minute.

\* \* Perianth-segments distinct, small, spreading, persistent.

19. **SMILACINA.** Flowers white, trimerous, solitary (in our species), with minute scarious bracts, in a racemose panicle or simple raceme on an erect leafy stem. Stamens at the base; filaments subulate; anthers short-oblong, versatile. Style short, thick, persistent; stigma 3-lobed. Ovules a pair in each cell. Berry red or blue-black, 1-3-seeded. Leaves mostly sessile.
20. **MAIANTHEMUM.** Flowers white, dimerous, solitary or fascicled, in a simple raceme upon a low 2-3-leaved stem. Filaments filiform. Berry red. Leaves ovate- to lanceolate-cordate, mostly petiolate. Otherwise as *Smilacina*.

TRIBE VII. **Nolineæ.** Flowers very small, whitish, polygamo-diœcious, on short jointed solitary or fascicled pedicels, in a simple or compound panicle on a leafy stem from a thick woody caudex or rootstock: perianth campanulate; segments 1-nerved: anthers ovate-cordate, versatile: stigmas very short, distinct, sessile or on a short style: ovules 6, in pairs at the base of the ovary: fruit dry and thin, indehiscent or bursting irregularly, 1-3-celled, 1-3-seeded: seed subglobose, with thin light-colored testa: leaves numerous, crowded, narrowly linear, elongated, rigid, striate, with rough or armed margins.

21. **NOLINA.** Flowers polygamo-diœcious in a loosely racemose simple or compound panicle; segments oblong-ovate, usually acutish. Stamens included. Stigmas sessile or nearly so. Fruit rounded, deeply triquetrous, thin-membranous, 3-celled, 1-3-seeded, bursting irregularly. Seeds ovate to globose. Leaves unarmed. Naked caudex slender with a dilated base, or very short or wanting. Fertile flowers mostly solitary and on longer pedicels than the staminate.
22. **DASYLIRION.** Flowers diœcious in dense racemes forming a narrow compound panicle, the tall leafy flowering stem terminating a stout naked cylindrical caudex. Perianth-segments oblong-obovate, obtuse. Stamens exerted. Style short. Fruit triangular and 3-winged, 1-celled, 1-seeded, coriaceous and indehiscent. Seed obtusely triangular. Leaves usually armed with hooked spines. Staminate flowers nearly sessile.

**TRIBE VIII. Hemerocallideæ.** Flowers large, on naked jointed pedicels with conspicuous bracts, simply racemose upon a leafy stem from a tunicated bulb (or fleshy-fibrous roots) : perianth funnel-form, 6-cleft : stamens on the throat ; anthers versatile : seeds (in our genus) horizontal, flattened, numerous, black.

23. **HESPEROCALLIS.** Perianth white, cleft to below the middle ; segments several-nerved. Anthers linear. Capsule ovate-oblong, deeply lobed. Raceme few-flowered, the stout pedicels jointed at the summit.

**TRIBE IX. Yuccææ.** Flowers racemose-paniculate upon a stout leafy or leafy-bracteate stem from a stout caudex or thick and often branching rootstock ; segments distinct : anthers versatile, sagittate : seeds numerous, in 2 rows in each cell, horizontal, flattened, black. Leaves numerous and crowded, linear, thick and more or less rigid : pedicels jointed at the summit.

24. **HESPERALOE.** Perianth narrowly cylindric, reddish ; segments linear, about 7-nerved. Filaments subulate-filiform, smooth ; anthers linear-oblong. Style filiform, deciduous ; stigma small, capitate. Capsule loculicidal, 3-celled. Caudex very short, sending up a slender sparingly bracteate flowering stem : leaves linear, deeply channelled, with filiferous margins : flowers fascicled, erect.

25. **YUCCA.** Perianth campanulate, white or whitish ; segments ovate-lanceolate, many-nerved. Filaments clavate, often papillose ; anthers small. Style stout and persistent (or none) ; the emarginate stigmas more or less connate into a stigmatic tube. Fruit baccate, or capsular and septicidal or loculicidal, incompletely 6-celled. Rarely acaulescent, usually with a stout woody caudex, often tall and tree-like : leaves linear-lanceolate, spinescent at apex : flowers usually solitary and nodding.

**SERIES II. Floral bracts none or foliaceous.** Perianth deciduous ; segments distinct, net-veined. Stamens hypogynous, or at the very base ; anthers more or less extrorse. Styles united at least at base, deciduous. Fruit loculicidally dehiscent or berry-like. Seeds turgid, with thin close brown testa. Flowers mostly large and showy, solitary or racemose or pseud-umbellate. Pedicels not jointed. Leaves with anastomosing veinlets.

*Exceptions.* Perianth persistent in *Lloydia* and *Trillium* ; segments several-nerved in *Lloydia*, *Clintonia*, *Medeola*, and *Scoliopus*. Anthers usually introrse in *Trillium*. Style persistent in *Lloydia* ; stigmas sessile and persistent in *Calochortus*, *Scoliopus*, and *Trillium*. Capsule mostly septicidal in *Calochortus*. Seeds flat and horizontal in most *Liliæ* ; crustaceous in *Clintonia*. Leaves with transverse veinlets in *Lloydia* (?), *Calochortus*, *Scoliopus*, and most *Uvulariææ*.

**TRIBE X. Liliææ.** Flowers terminal or axillary or subumbellate, upon a more or less leafy stem from a bulb or coated corm, campanulate or funnel-form ; segments usually nearly equal and similar, bearing a nectary or gland : capsule many-seeded : seeds horizontal or ascending.

\* Stem simple, strict, leafy, from a scaly bulb: floral bracts leaf-like: anthers versatile: styles elongated: capsule not triquetrous: seeds flat, horizontal.

26. *LILIUM*. Perianth-segments oblanceolate, more or less spreading or recurved, often dotted or spotted; nectary a linear groove. Anthers distinctly versatile. Style undivided. Bulb-scales lanceolate.

27. *FRITILLARIA*. Perianth-segments broader and concave, often mottled; nectary a shallow pit. Anthers more obscurely versatile. Styles united to the middle or throughout. Bulb-scales mostly short, very thick.

\*\* Stem simple, low, lax, from an oblong membranous-coated corm, bearing a pair of dilated leaves, without floral bracts: anthers basifixed: styles elongated: capsule triangular or triquetrous: seeds ascending, turgid, brownish.

28. *ERYTHRONIUM*. Perianth-segments oblanceolate, strongly revolute, mostly callous-toothed at base each side of the grooved nectary. Styles usually distinct above. Seeds obovoid, angled, the testa loose and rugose at top.

\*\*\* Stem simple, dwarf, from a small tunicated bulb: leaves linear, without veinlets: perianth persistent, the equal segments 3-nerved, with a naked obscure gland at base: anthers very small, basifixed: style slender, undivided, persistent: capsule triquetrous: seeds horizontal, flat. — Subtribe *LLOYDIEÆ*.

29. *LLOYDIA*. Perianth small, spreading, white with purplish veins and base. Stem slender, leafy, usually 1-flowered; the bulb upon an oblique rhizome, covered by the persistent scarious bases of the nearly filiform leaves. Arctic or alpine.

\*\*\*\* Stem usually branched, from a coated corm, sparingly leafy: leaves with transverse veinlets: perianth of unequal segments, the outer smaller, somewhat greenish and sepaloid, the inner dilated and mostly with pitted and bearded or crested glands: anthers basifixed: stigmas sessile, distinct, recurved, persistent: capsule usually deeply triquetrous, mostly septicidal: seeds ascending, with light-colored spongy testa, rarely flat and horizontal. — Subtribe *CALOCHORTEÆ*.

30. *CALOCHORTUS*. Flowers mostly large and showy, broadly campanulate. Stem usually lax or flexuous, from a membranous- or rarely fibrous-coated corm.

TRIBE XI. *Uvulariææ*. Flowers terminal or pseud-axillary, solitary or subumbellate, with naked pedicels on leafy branching stems (or in *Clintonia* on a scape-like peduncle) from a short or creeping rootstock: perianth narrowly campanulate; segments oblanceolate, with a nectariferous groove at the narrow subgibbous base: anthers linear: styles linear, more or less united, stigmatic down the inside: fruit a loculicidal or tardily dehiscent capsule, or berry-like: seeds pendulous: stems scaly-bracted below: leaves dilated, with numerous nerves and transverse veinlets (reticulated in *Prosartes*).

31. **UVULARIA.** Flowers few (1 to 3), solitary, terminating the stem or leafy branches, pendulous, yellow; segments acuminate, obtusely gibbous and with a callus or ridge each side of the deep nectary. Anther-cells adnate to the prolonged connective. Styles united to the middle. Capsule coriaceous, depressed obovate, obtusely 3-lobed, loculicidal at the summit. Seeds 1 or 2 in each cell, globose, brown, half covered by a thin white aril. Stem terete, from a short rootstock with fleshy-fibrous roots. Leaves perfoliate, smooth on the margin.
32. **OAKESIA.** Flowers few, solitary, on short pedicels opposite the leaves, pendulous, yellow; segments obtuse or acutish, carinately gibbous and without callosities. Stamens and styles as in the last. Capsule membranous, elliptical, acutish at each end or shortly stipitate, triquetrous and acutely winged, very tardily dehiscent. Seeds 1 to 3 in each cell, globose, brown, with a very tumid spongy brown rhaphe. Stem acutely angled, from a slender creeping rootstock. Leaves sessile, clasping, with scabrous margins.
33. **STREPTOPUS.** Flowers more numerous, apparently axillary, the pedicel often geniculate upon a peduncle (a second or third pedicel and flower sometimes developed), pendulous, greenish-white or purplish; segments acuminate, recurved above. Anthers sagittate, on short deltoid or subulate filaments, acute or setaceously acuminate. Styles united. Fruit a reddish subglobose slightly 3-lobed berry. Seeds few to many in each cell, oblong, longitudinally striate, light-colored. Leaves clasping.
34. **PROSARTES.** Flowers in fascicles (1-6-flowered) terminating the branches, white or greenish, suberect or pendulous; segments acute or acuminate. Anthers on slender filaments, oblong, obtuse, dehiscing laterally. Styles united. Ovules 1 to 3 pairs in each cell. Fruit a somewhat fleshy obtusely lobed reddish berry. Seeds subglobose to oblong, with very thin close light-colored testa. Leaves with reticulated veinlets.
35. **CLINTONIA.** Flowers solitary or umbellate upon a naked scape-like peduncle, white, greenish, or rose-colored, erect or nodding; segments obtuse or acutish. Anthers on slender filaments, oblong to linear, dehiscing laterally. Ovary 2-3-celled: styles united; stigma 2-3-lobed (ovary 2-celled and stigma only slightly 2-lobed in our species). Fruit a thin slightly lobed ovoid blue berry. Seeds smooth, brownish, crustaceous. Root-stock slender, creeping: leaves radical, large, oblanceolate, sheathing, ciliate.

**TRIBE XII. Trillieæ.** Flowers terminal, on solitary or umbellate naked pedicels subtended by a pair or whorl of leaves upon an otherwise naked stem (a second whorl in *Medeola*), from a thick or tuberous rootstock. Perianth spreading, the segments mostly dissimilar in the two series, the outer often herbaceous, without glands. Stigmas sessile or nearly so, linear, channelled, persistent (except in *Medeola*). Fruit dry or berry-like. Seeds horizontal or ascending. Leaves broadly ovate to oblanceolate, mostly net-veined.

\* Flowers umbellate; segments dissimilar, all petaloid, several-nerved, deciduous: stamens 3; anthers attached above the base: stigmas persistent: fruit dry, 1-celled with parietal placentæ, many-seeded. Nearly acaulescent; leaves a radical pair, with numerous parallel nerves and transverse veinlets. — Subtribe **SCOLIOPÆ.**

36. **SCOLIOPUS.** Flowers purplish, on slender flexuous pedicels; outer segments lanceolate, inner narrowly linear. Anthers oblong; filaments short, filiform-subulate. Style short; stigmas recurved. Fruit thin-membranous, bursting irregularly, triquetrous, oblong, acute at each end, placentiferous at the angles. Seeds oblong, striate longitudinally, with light-colored testa, dark chalaza and crested rhaphe. Rootstock short with numerous fleshy-fibrous roots: whole plant brown-punctate, glabrous.

\* \* Flowers umbellate; segments similar, several-nerved, deciduous: anthers attached above the base: stigmas (3 or 4) sessile, deciduous: fruit a few-seeded berry: stem slender, bearing two distant whorls of 3-nerved net-veined leaves. — Subtribe **MEDEOLEÆ.**

37. **MEDEOLA.** Flowers greenish-white, on recurved pedicels; segments oblong, obtuse, recurved. Anthers oblong; filaments filiform. Stigmas elongated, divaricate. Berry subglobose, purple. Seeds roundish. Rootstock tuberous with slender rootlets.

\* \* \* Flowers solitary; outer segments herbaceous; inner petaloid, net-veined, marcescent: anthers adnate, usually introrse: stigmas sessile, persistent: fruit a many-seeded berry: stem with a single whorl of 3-5-nerved net-veined leaves.

38. **TRILLIUM.** Flowers white to purple, sessile or pedicellate; segments ovate to linear-lanceolate, more or less spreading or recurved, the outer smaller. Anthers linear; filaments linear-subulate. Stigmas linear or subulate, usually recurved above. Fruit reddish, ovate or subglobose, 3-lobed or more often 6-angled or -winged, occasionally 1-celled with parietal placentæ. Seeds ovate, scarcely striate, with thick rhaphe.

**SERIES III.** Perianth persistent; segments distinct, 1-several-nerved. Stamens at the base of the perianth; anthers extrorse, versatile, small, distinctly 2-celled except in *Veratrea*. Styles or sessile stigmas distinct. Capsule septicidal, triquetrous. Seeds ascending, with loose testa or more or less

appendaged, not black. Inflorescence a simple raceme or panicle; pedicels solitary, not jointed, with green or greenish or rarely scarious bracts, or naked. Leaves with transverse veinlets, except in *Heloniææ*.

*Exceptions.* Anthers introrse in *Tofieldiææ*; filaments adnate in *Melanthium*. Style none or undivided in *Nartheceum*. Capsule loculicidal in *Nartheceum* and *Xerophyllum*. Seeds horizontal in *Tofieldia* and *Pleea*.

**TRIBE XIII. Veratreeæ.** Perianth-segments several-nerved, often adnate to the base of the ovary. Anthers cordate or reniform, dehiscent by a continuous slit and peltate after opening: stigmas terminal: capsule membranous, 3-beaked by the short persistent styles: seeds with thin loose testa, not caudate or appendaged: stem usually leafy, from a tunicated bulb or thick rootstock: leaves not rigid.

\* Flowers usually polygamous: cells of the usually ovate-oblong capsule not divaricately divergent above, dehiscent to the base: seeds several (4 to many) in each cell, not turgid, oblong to linear, angled, or flattened and margined.

+ Inflorescence pubescent, racemose-paniculate, usually staminate below: seeds flat, whitish, mostly broadly margined: stems tall and leafy, from a thick rootstock with fleshy-fibrous roots: leaves linear-oblong to sub-orbicular.

39. **MELANTHIUM.** Flowers cream-color or greenish, rotate, shorter than the slender spreading pedicels; segments orbicular to oblanceolate, conspicuously biglandular or glandless, the filaments adnate to the narrow claw; perianth free from the ovate-oblong capsule.

40. **VERATRUM.** Flowers cream-color, greenish, or purple, more or less spreading, usually exceeding the short stouter pedicels; perianth slightly adnate to the ovary; segments oblanceolate to rhombic-ovate, glandless or rather obscurely glandular. Leaves strongly nerved and more or less plicate.

+ + Inflorescence glabrous: flowers perfect or polygamous: seeds linear to narrowly oblong, angled or slightly margined, more or less brown: root bulbous (except in one species of *Zygadenus*): leaves linear.

41. **STENANTHIUM.** Flowers white, greenish, or purple, nodding or subsessile in usually paniculate racemes. Perianth adnate to the base of the ovary; segments lanceolate, acuminate, without glands. Seeds 4 in each cell, angled or somewhat flattened.

42. **ZYGADENUS.** Flowers white or greenish, erect, in paniculate or simple racemes. Perianth often adnate at base; segments oblong-lanceolate to ovate, mostly glandular and usually somewhat narrowed at base. Seeds angled, rarely at all margined.

43. **SCHENOCAULON.** Flowers small, mostly green, nearly sessile in a simple many-flowered spike-like raceme (usually sterile



above), upon a naked scape. Perianth free; segments linear or linear-oblong, obtuse, without glands and nearly nerveless. Stamens long-exserted. Seeds brown, angled. Leaves elongated, dry and grass-like. Bracts very small, ovate, membranous. Bulb-coats becoming black and fibrous.

\* \* Flowers perfect: capsule short, the 1-2-seeded cells widely divergent above and dehiscent only at the summit: seeds ovate, with a (fleshy?) reddish-brown coat. Bulbous.

44. **AMIANTHIUM**. Glabrous. Flowers white, much shorter than the pedicels, in a dense many-flowered simple raceme on a sparingly leafy stem. Perianth free; segments ovate-oblong, obtuse, glandless. Leaves linear, obtuse.

TRIBE XIV. **Heloniæ**. Inflorescence a simple raceme, without bracts, on a leafy stem from a thick tuberous rootstock; glabrous. Flowers perfect or diœcious, glandless. Styles linear, stigmatic down the inside, deciduous. Capsule membranous, obovate to oblong, ventrally dehiscent at the summit of the abruptly divergent cells. Seeds numerous, linear, ascending from near the base, appendaged or winged at each end. Leaves oblanceolate, thin; veinlets anastomosing.

45. **HELONIAS**. Flowers perfect, in a short dense raceme, purple or greenish; segments spatulate-oblong, several-nerved, shorter than the slender filaments. Capsule broadly obovate, deeply 3-lobed, the summit much depressed. Seeds narrowly linear with a short white appendage at each end. Stem scaly-bracteate.
46. **CHAMÆLIRIUM**. Flowers diœcious, in slender elongated racemes, white: segments narrowly linear-spatulate, 1-nerved, equalling the stamens, which are shorter and abortive in the pistillate flowers. Capsule oblong, slightly depressed and shortly lobed at the summit. Seeds flattened, margined, and winged at each end. Stem very leafy.

TRIBE XV. **Tofieldiæ**. Flowers perfect, on bracteolate pedicels, in a simple raceme on an equitant-leafy stem from a creeping rootstock. Perianth-segments narrow, without glands. Stamens 9 to 12 in *Pleea*; anthers introrse, short, ovate to linear. Styles distinct and persistent, or none; stigmas terminal. Capsule dehiscing to the base, loculicidal in *Narthecium*. Seeds numerous, small, mostly appendaged or caudate, brown. Leaves distichously equitant, much shorter than the stems.

47. **TOFIELDIA**. Flowers white or greenish, subtended by very small bracts and involucrate with 3 scarious verticillate and more or less united bractlets; perianth-segments oblong or obovate, 3-nerved, equalling the stamens. Anthers round-cordate, nearly basifixed; filaments narrowly subulate, naked. Styles short.

- Capsule ovate to obovate, 3-beaked. Seeds horizontal, unappendaged or more or less caudate at the outer end.
48. **PLEEA.** Flowers few, greenish-white turning brown. Pedicels solitary in the axils of large foliaceous sheathing bracts, bibraeteolate in the middle. Perianth-segments lanceolate, 1-nerved. Stamens 9 ("6 to 12"), in pairs on the outer sepals, included; filaments subulate, naked; anthers oblong-linear, sagittate. Styles short. Capsule coriaceous, ovate, 3-beaked. Seeds horizontal, linear, attenuate at base, caudate above.
49. **NARTHECIUM.** Flowers yellowish-green, the solitary pedicels subtended by a lanceolate bract and bearing a small linear bractlet. Perianth-segments linear-lanceolate, obscurely 3-nerved. Stamens included; filaments subulate, woolly; anthers linear-oblong. Style none; the slightly lobed stigma sessile upon the attenuated apex of the ovary. Capsule narrowly oblong, membranous, attenuate upward, splitting loculicidally into 3 valves. Seeds ascending from near the base of the axis, linear, with a long straight tail at each end.

**TRIBE XVI. Xerophylleæ.** Flowers perfect, on naked pedicels in a simple bracteate raceme, on a very leafy stem from a thick tuberous rootstock. Glands none. Styles linear, stigmatic down the inside, persistent. Capsule ovate, chartaceous, loculicidally dehiscent to the base, and sometimes septicidal. Seeds 2 to 4 in each cell, ascending, with loose thin testa, not appendaged or scarcely so. Leaves very narrow, dry, striate and rough-edged.

50. **XEROPHYLLUM.** Flowers white, on long spreading pedicels (erect in fruit), in a subpyramidal many-flowered raceme; segments ovate to oblong, 5-7-nerved. Styles reflexed or recoiled. Seeds oblong, somewhat angled, light-colored. Cauline leaves numerous, setaceous from a broader base. Bracts linear, elongated.

In addition to the above, other genera are represented by the following species that have become more or less widely naturalized in some sections of the Atlantic States :—

**ORNITHOGALUM UMBELLATUM**, Linn. The Star of Bethlehem; in moist meadows.

**MUSCARI BOTRYOIDES**, Mill. The Grape-Hyacinth; road-sides and copses.

**HEMEROCALLIS FULVA**, Linn. The Day-Lily; road-sides.

**ASPARAGUS OFFICINALIS**, Linn. Garden Asparagus: sea-coast and copses.

## 1. ALLIUM, Linn.

§ 1. Bulbs cespitose, narrowly oblong and crowning a more or less persistent rhizome; coats membranous, without peculiar reticulation: spathe mostly 2-valved: scape terete.

\* Leaves (2 or 3) elliptic-lanceolate: ovules solitary.

1. *A. TRICOCCUM*, Ait. Bulb-coats fleshy-membranous, the outer becoming fibrous: scape 4 to 12 inches high: flowers greenish white, on short suberect pedicels; segments two or three lines long, the outer channelled, the inner flat: stamens short, hypogynous, with nearly distinct subulate filaments: capsule deeply lobed, not crested. — *A. triflorum*, Raf. New England to Wisconsin, and south to North Carolina and Kentucky.

\* \* Leaves (several) linear: ovules a single pair.

+ Leaves terete, hollow.

2. *A. SCHÆNOPRASUM*, Linn. Scape stout: umbel subcapitate: flowers rose-color; segments 4 or 5 lines long, acuminate: stamens included: capsule not crested. — *A. campanulæflorum*, Geyer. From Canada (New Brunswick) and the Great Lakes to the Columbia and Peace Rivers and N. Alaska; Europe and N. Asia.

+ + Leaves flat or channelled.

3. *A. CERNUUM*, Roth. Outer bulb-coats sometimes finely fibrous: scapes slender,  $\frac{1}{2}$  to 2 feet high: leaves 1 to 4 lines broad: umbel open, nodding: flowers numerous, on very slender pedicels, rose-colored or white; segments 2 or 3 lines long, broad and acutish: stamens and style exserted: capsule crested. — From the Alleghany Mountains to British Columbia, Oregon, Utah, New Mexico and Texas.

4. *A. VALIDUM*, Watson. Scape very stout, 1 to  $2\frac{1}{2}$  feet high, from a stout rhizome: leaves 2 to 8 lines broad: umbel often slightly nodding, with 2 to 4 bracts, densely many-flowered; pedicels short: flowers rose-colored or nearly white; segments 3 or 4 lines long, narrowly acuminate: stamens and style usually slightly exserted: capsule not crested, subglobose. — King's Rep. 5. 350. Oregon to N. California and N. Nevada.

5. *A. BREVISTYLUM*, Watson, l. c. Scape 1 to  $1\frac{1}{2}$  feet high, from a stout rhizome: leaves 2 to 4 lines wide: spathe 1-valved: umbel erect, few-flowered; pedicels 6 to 12 lines long: flowers deep rose-color; segments 4 or 5 lines long, narrow, long-acuminate, nearly twice longer than the stamens and style: capsule not crested. — Northwestern Wyoming to S. Utah.

6. *A. HÆMATOCHITON*. Bulb-coats deep red : scape a foot high or less : leaves about a line wide : umbel erect or nearly so, few-many-flowered ; pedicels short : flowers 3 or 4 lines long, deep rose-color, especially on the midveins of the ovate-lanceolate acute segments : stamens and style included ; filaments very slender : ovary truncate, with very short rounded crests ; capsule obovate. — California (San Luis Obispo to Ojai ; n. 462, Brewer).

§ 2. Bulbs globose to ovate, mostly solitary, not rhizomatous ; coats fibrous or membranous : leaves narrowly linear, flat or channelled : scape terete or nearly so.

\* Bulb-coats more or less fibrous : leaves several.

+ Capsule not crested : spathe usually 3-valved.

7. *A. CANADENSE*, Kalm. Bulb-coats somewhat fibrous : scape a foot high or more : umbel mostly bulbiferous (often with 2 or 3 flowers) : flowers on slender pedicels (6 to 10 lines long), white or pinkish, 3 lines long ; segments narrowly lanceolate, obtusish, equalling or somewhat exceeding the stamens : filaments slightly broader below. — *A. longicaule*, Hornem.? From Canada to Florida and Texas.

8. *A. MUTABILE*, Michx. Like the last : bulbs densely and coarsely fibrous-coated : scape a foot or two high : umbel few-many-flowered, rarely or never bulbiferous : flowers white to rose-color, 2 to 4 lines long ; segments thin and lax in fruit, ovate- to narrowly lanceolate, obtusish or acute, a third longer than the stamens. — *A. Mobilense* and *Drummondii*, Regel, Monogr. All. 112 and 121. *A. reticulatum*, var.  $\gamma$ , Watson, King's Rep. 5. 486. From North Carolina and Florida to Arkansas and New Mexico.

9. *A. NUTTALLII*. Bulb usually smaller, very fibrous : scape low (4 to 6 inches high) : pedicels shorter (4 to 6 lines) and usually rather stouter : perianth-segments usually broader (3 lines long), acute or acuminate, rose-colored or white, rather rigid in fruit. — *A. mutabile*,  $\beta$ , Watson. From Kansas and Colorado to Texas, New Mexico and Eastern Arizona (n. 3219, Berland. ; n. 528, Lindh. ; n. 847, Fendl. ; n. 195, Hall & Harbour ; n. 647, Hall ; n. 197, 237, Rothrock).

+ + Capsule crested : spathe usually 2-valved.

10. *A. RETICULATUM*, Fraser. Scape 3 to 8 inches high : pedicels usually short (2 to 6 lines long) : otherwise closely resembling *A. mutabile*. — Hook. Fl. Bor.-Am. 2. 184, t. 195. *A. stellatum*, var., Sims, Bot. Mag. t. 1840. *A. angulosum*, Pursh. From the Saskatchewan to New Mexico and N. Arizona.

11. *A. GEYERI*. Taller and stouter (a foot high) : pedicels 6 to 12 lines long : flowers rose-colored, 4 lines long, the segments broad,

acute or acuminate, strongly nerved and rigid in fruit. — *A. reticulatum*, var.  $\beta$ , Watson, King's Rep. 5. 486. Idaho to Washington Territory and Oregon (n. 226, Geyer; n. 546, Hall & Harbour; n. 386, Howell; Spalding; Wyeth).

\* \* Bulb-coats not fibrous; some of the outer membranous coats in most species marked by a more or less distinct peculiar reticulate venation: leaves several (2 to 4), shorter than or about equalling the scape: spathe 2-valved, except in n. 21: stamens and style exerted only in n. 20 and 21.

+ Ovary not crested or obscurely 3-crested: perianth-segments not serrulate.

++ Scape usually tall (a foot high or more).

12. *A. SCAPOSUM*, Benth. Outer bulb-scales dark, with coarse more or less regular vertically oblong rectilinear reticulation: umbel loose, rather few-flowered: perianth-segments white with red midvein, lanceolate, acuminate, 3 or 4 lines long. — Watson, King's Rep. 5. 487, t. 38, f. 10, 11. W. Texas to S. Arizona and Mexico. This is probably identical with the older *A. Kunthii*, Don (*Schænoprasum lineare*, HBK.)

++ ++ Scape low.

13. *A. DOUGLASII*, Hook. Reticulation of bulb-coats not detected: scape 8 or 10 inches high: flowers pale rose-color, 3 or 4 lines long; segments lanceolate, acuminate, scarcely exceeding the stamens and style: ovary not at all crested. — Oregon ("Blue Mountains, subalpine hill near Kettle Falls," Douglas). A very obscure species, not identified in recent collections. The figure and description in Hook. Fl. Bor.-Am. refer, with the exception of the scape and the details of the flower, to his var.  $\beta$ , i. e. to *A. Tolmiei*, Baker.

14. *A. MADIDUM*. Bulbs white, bulbiferous at base, without reticulation: leaves 2, thick and channelled,  $1\frac{1}{2}$  to 3 lines broad: scape stout, angled, 4 to 8 inches high: flowers usually many, on pedicels 4 to 6 lines long, white or nearly so, 4 lines long; segments ovate-oblong, acute, a little exceeding the stamens: cells of the ovary with two fleshy ridges at the summit. — Union County, Oregon; W. C. Cusick, n. 382. In small streams or wet places in high ground.

15. *A. CUSICKII*. Reticulation of bulb-coats not detected: leaves 2, flat, somewhat falcate, 3 lines wide: scape 3 or 4 inches high: flowers rather numerous, on pedicels 6 to 8 lines long, nearly white, 4 or 5 lines long; segments lanceolate, broadly acuminate, nearly twice longer than the stamens and style: ovary-cells shortly apiculate. — Union County, Oregon; W. C. Cusick, n. 179.

16. *A. COLLINUM*, Dougl. in herb. Known to me only from scanty flowers from Kew Herb. Perianth-segments ovate-lanceolate, acute,

4 lines long, twice longer than the slender stamens and style: capsule very obscurely ridged toward the summit. — “Abundant on the Blue Mountains,” Oregon.

17. *A. SCILLOIDES*, Dougl. in herb. An equally obscure species. Perianth-segments oblong-lanceolate, obtuse, 3 lines long, a half longer than the stamens: ovary not at all crested. — “Priest’s Rapids, Columbia River.”

+ + Ovary rather obscurely crested: scapes low (4 to 10 inches): perianth-segments (at least the inner ones) serrulate.

18. *A. ACUMINATUM*, Hook. Outer bulb-coats with a distinct coarse quadrate to hexagonal reticulation: pedicels (12 to 30) 6 to 12 lines long: flowers deep rose-color, 4 to 7 lines long; segments lanceolate, with acuminate recurved tips, rigid in fruit, a third longer than the stamens, the inner ones undulate-serrulate: filaments slightly dilated below. — Fl. Bor.-Am. 2. 184, t. 196; Watson, King’s Rep. 5. 352, t. 37, f. 6. *A. Murrayanum*, Regel, Gartenfl. 23. 200, t. 770. From Washington Territory to Northern California, Nevada and Utah. *A. Elwesii*, Regel, Pl. Nov. fasc. 5. 50, is probably a form of this species with more obtuse perianth-segments.

19. *A. BOLANDERI*. Bulb or coated corm propagating by one or two very short lateral offshoots, the coats with a delicate close undulate-serrate reticulation: pedicels 5 to 15: flowers rose-colored or pinkish, 4 or 5 lines long, the segments very narrowly acuminate, nearly straight, twice longer than the stamens and style, the inner ones strongly serrulate: filaments narrowly filiform, adnate to the middle. — Humboldt County, California (n. 6556, Bolander; n. 1011, Kellogg & Harford; Rattan).

+ + + Ovary distinctly 6-crested (obscurely so in n. 27, 28): perianth-segments not serrulate, mostly rose-colored.

+ + Scapes often rather tall.

20. *A. STELLATUM*, Fraser. Outer bulb-coats reddish, with a very close linear longitudinal reticulation: scape 6 to 18 inches high: umbel few-many-flowered; pedicels 4 to 9 lines long: perianth-segments 2 or 3 lines long, broad, acute: stamens and style exerted: capsule prominently crested. — Ker, Bot. Mag. t. 1576; Hook. Fl. Bor.-Am. 2. 184, t. 194. From the Saskatchewan to Wyoming.

21. *A. SANBORNII*, Wood. Outer bulb-scales white, some with a very minute irregular reticulation: scape usually a foot or two high: spathe 4-valved: umbel usually densely many-flowered, the pedicels 3 to 8 lines long: perianth-segments  $2\frac{1}{2}$  or 3 lines long, ovate-lanceo-

late, thin and lax in fruit: stamens and style exerted: capsule very thin. — Proc. Philad. Acad. 1868, 171; Watson, l. c. 486, t. 37, f. 7. Sierra Nevada (Yuba to Mariposa Counties).

22. *A. ATTENUIFOLIUM*, Kellogg. Reticulation delicate, horizontally sinuate or serrate, the vertical lines also minutely sinuous: leaves channelled: scape slender (6 to 15 inches high), leafy below: spathe-valves short and abruptly acute: umbel usually dense: perianth-segments 3 or 4 lines long, oblong-lanceolate, acuminate, lax and thin in fruit, white or nearly so. — Proc. Calif. Acad. 2. 110, f. 34; Watson, l. c., t. 37, f. 8, 9. *A. reticulatum*, Benth. Pl. Hartw. 339. *A. amplexans*, Torrey, Pacif. R. Rep. 4. 148. *A. occidentale*, Gray, Proc. Amer. Acad. 7. 390. Sierra Nevada and Coast Ranges, from Mariposa County and San Francisco to Oregon.

++ ++ Scapes low: flowers rose-colored.

= Filaments more or less deltoid above the united discoid adnate base.

23. *A. SERRATUM*, Watson. Resembling *A. acuminatum*; bulb-coats readily fissile along the lines of the fine distinct horizontally serrate reticulation: leaves very narrow: spathe-valves narrowly acuminate: perianth-segments 4 to 6 lines long, deep rose-color, broadly ovate-lanceolate, acute or somewhat acuminate, nearly straight and rather rigid, the inner very rarely serrulate: filaments all with a narrowly deltoid base above the very short disk: crests very narrow, central. — King's Rep. 5. 487, t. 37, f. 4, 5 (reticulation). Coast Ranges (San Diego to Marin County) and foot-hills of the Sierra Nevada.

24. *A. BISCEPTRUM*, Watson. Bulbs light-colored; reticulation indistinct, somewhat quadrilateral, the cells under a strong power showing an exceedingly sinuous outline especially on the vertical lines: leaves often 2 or 3 lines broad: scapes frequently in pairs: flowers few to many, rose-color, 3 or 4 lines long; segments oblong-lanceolate, acuminate, slightly exceeding the stamens: the alternate filaments with a broad deltoid adnate base: crests thin, conspicuous. — King's Rep. t. 37, f. 1-3 (the figure of the flower faulty as respects the base of the filaments). Sierra Nevada (Mono Lake and northward) and mountains eastward to Utah.

25. *A. PALMERI*, Watson. Habit of the last: bulb-coats with a distinct somewhat quadrilateral reticulation, the outline of the cells very minutely sinuous: scape always solitary: perianth-segments 3 to 5 lines long, ovate-lanceolate, acuminate: filaments and crests nearly as in the last. — King's Rep. 5. 487, t. 37, f. 10, 11. S. Utah to E. Arizona and New Mexico.

26. *A. BIGELOVII*, Watson. Bulb-coats very dark; reticulation distinct, of nearly regular vertically oblong cells: scape 3 to 6 inches high: flowers rather few, on stout pedicels 4 to 8 lines long, tinged with deep rose-color; segments oblong-lanceolate, acute, 4 to 6 lines long: filaments all with a rather narrowly deltoid base: crests conspicuous.—King's Rep. 5. 487, t. 38, f. 8, 9. Arizona (n. 532, Palmer) and New Mexico.

27. *A. LACUNOSUM*. Bulb-coats light-colored, thick and distinctly pitted by the quadrate or transversely oblong reticulation, the outlines very minutely sinuous: scape 3 to 6 inches high: flowers usually few (5 to 20), on pedicels 3 to 5 lines long; segments 3 or 4 lines long, oblong-lanceolate, acuminate, a little longer than the filaments, which are all narrowly deltoid at base: cells of the ovary with an obtuse thickened ridge toward the top on each side.—Coast Ranges (Santa Clara County, on Mariposa Peak; n. 1284, Brewer).

28. *A. NEVII*. Bulb-coats white or reddish, thin, with compressed transversely oblong reticulation (as in *A. tribracteatum*), the cell-outline not at all sinuous: scape slender, 6 or 8 inches high: pedicels rather few, slender, 4 to 6 lines long: perianth-segments light rose-color, lanceolate, acuminate, 3 lines long, scarcely exceeding the stamens and style: cells of the ovary with a thick short crest on each side near the summit.—Oregon (Hood River; Rev. R. D. Nevius).

= = Filaments filiform above the obscurely and obtusely lobed disk.

29. *A. CAMPANULATUM*. Bulb-coats not known: scape 4 to 6 inches high: umbel somewhat nodding, many-flowered, the slender pedicels 4 to 15 lines long: flowers somewhat campanulate, the segments broadly ovate-lanceolate, acute or abruptly and shortly acuminate, 4 lines long, a third longer than the very slender stamens and style: capsule prominently crested.—Sierra Nevada (Mariposa to Plumas Counties; n. 4943, Bolander; Mrs. M. E. P. Ames).

30. *A. BIDWELLÆ*. Reticulation of bulb-coats not known: scape 2 or 3 inches high: umbel rather few-flowered, the pedicels a half-inch long: perianth-segments narrowly lanceolate, acuminate,  $2\frac{1}{2}$  or 3 lines long, scarcely exceeding the stamens and style: crests conspicuous.—Sierra Nevada (above Chico, Mrs. J. Bidwell, May, 1878).

\* \* \* Bulb-coats not fibrous: leaf solitary, narrowly linear or filiform, equaling or somewhat exceeding the low scape (2 to 5 inches): capsule prominently 6-crested: stamens and style included.

+ Stigma 3-cleft with linear lobes: leaf revolute-filiform: scape very slender.

31. *A. PARRYI*. Bulb-coats reddish-brown, without reticulation: scape 3 to 6 inches high: spathe-valves 2 or 3, abruptly setaceous-



acuminate: pedicels (12 to 30) 4 to 8 lines long: perianth-segments rose-colored, lanceolate, acuminate, 3 or 4 lines long, a third longer than the stamens: crests emarginate or erose. — Coast Ranges (San Bernardino County, Dr. C. C. Parry, n. 390, 1876).

32. *A. FIMBRIATUM*. Bulb unknown: scape 3 inches high: pedicels 3 or 4 lines long: flowers deep rose-color, 5 lines long; segments lanceolate, acuminate, nearly a half longer than the stamens and style: crests fimbriate. — S. California (on the Mohave River; Dr. E. Palmer, 1876).

+ + Stigma entire: leaf flat: scape stout, 1 to 3 inches high.

33. *A. CRISTATUM*. Bulb-coats brownish, some with very faint quadrangular reticulation: spathe-valves more acuminate: pedicels 3 or 4 lines long: perianth light rose-color, 5 lines long; segments lanceolate, acuminate, nearly twice longer than the stamens and style: crests very long, acute, somewhat glandular-toothed. — S. Utah (St. George; Dr. E. Palmer, n. 454, 1877).

34. *A. NEVADENSE*, Watson. Bulb-coats light-colored, with evident close very much distorted reticulation: spathe-valves acuminate: pedicels half an inch long: perianth white or pinkish, 4 lines long; segments lanceolate, acute or shortly acuminate, little exceeding the stamens and style: crests acutish or obliquely truncate, entire or nearly so. — King's Rep. 5. 351, t. 38, f. 1-3. N. Nevada to S. Utah.

35. *A. ATRORUBENS*, Watson. Reticulation of bulb-coats not detected: pedicels 5 to 7 lines long: spathe-valves 3, long-acuminate: perianth reddish-purple, 5 or 6 lines long; segments lanceolate, acuminate, little exceeding the very slender and slightly united stamens: crests acute, laciniately toothed. — King's Rep. 5. 352, t. 38, f. 4, 5.

\* \* \* \* Leaves 1 to several, linear, greatly exceeding the very short scape: capsule not crested, or very obscurely so.

36. *A. TRIBRACTEATUM*, Torrey. Bulb-coats thin, with distinct compressed transversely oblong reticulation: leaves 3 or 4 inches long,  $\frac{1}{2}$  to 3 lines broad: scape an inch or two high: spathe-valves 3, long-acuminate: pedicels slender, 2 or 3 lines long: perianth pinkish with dark midveins, 3 lines long; segments narrowly oblong-lanceolate, acutish, not gibbous at base, a little longer than the stamens. — Pacif. R. Rep. 4. 148; Watson, l. c. 353, t. 38, f. 6, 7. Sierra Nevada, to 10,000 feet altitude (Mono to Nevada Counties; n. 1799, Brewer).

37. *A. PARVUM*, Kellogg. Resembling the last: bulb-coats without reticulation: scape scarcely rising above ground: spathe-valves 2,

short, abruptly acute: pedicels stouter: perianth-segments more obtuse, broader, 3 or 4 lines long. — Proc. Calif. Acad. 3. 54, f. 13. *A. tribracteatum*, var. *Andersoni*, Watson, l. c. 353. East base of Sierra Nevada (Carson City to Plumas County).

38. *A. MACRUM*. Bulb-coats without reticulation: leaves more distinctly sheathing: scape an inch or two high: spathe-valves 2, abruptly acute: umbel more spreading; pedicels slender, 2 or 3 lines long: perianth white or pinkish, 2 or 3 lines long; segments narrowly lanceolate, acuminate, scarcely exceeding the stamens and style: cells of the ovary bordered above by a thick obtuse ridge. — Union County, Oregon, on rocky hills; W. C. Cusick, n. 40, 1877.

§ 3. Bulbs ovate, not rhizomatous, the membranous coats mostly without reticulation: leaves 2, broadly linear, flat and falcate, thick: scape stout, much compressed and 2-winged, low and mostly shorter than the leaves.

\* Spathe 2-valved: stamens included: ovary mostly crested.

39. *A. FALCIFOLIUM*, Hook. & Arn. Scape 2 or 3 inches high: flowers rose-colored, 4 to 6 lines long; segments lanceolate, attenuate and spreading above, minutely glandular-serrate, nearly twice longer than the stamens and style: capsule acute with 3 short narrow central crests. — Bot. Beechey, 400; Watson, l. c. 488, t. 36, f. 7, 8. Coast Ranges (Sonoma to Humboldt Counties).

40. *A. BREWERI*. Flowers deep rose-color, 5 or 6 lines long; segments lanceolate, acute, nearly erect, not serrulate, a third longer than the stamens and style: ovary and capsule with a thick slightly lobed crest at the apex of each cell. — Summit of Mount Diablo, California; n. 1060, Brewer.

41. *A. ANCEPS*, Kellogg. Bulb-coats sometimes with minute transversely oblong reticulation: pedicels very slender, 6 to 9 lines long: flowers nearly white with purplish midveins, 3 or 4 lines long; segments very narrowly lanceolate, acuminate, lax, scarcely gibbous at base, little exceeding the stamens and style: capsule-cells with two broad obtuse crests. — Proc. Calif. Acad. 2. 109, f. 32; Watson, l. c. 352, t. 36, f. 4–6 (faulty in showing the capsule without crests). East base of the Sierra Nevada (Carson City to Modoc County); Oregon (Columbia Valley; J. Howell).

42. *A. PLEIANTHUM*. Scape 4 or 5 inches high: flowers numerous, apparently white, 4 or 5 lines long, on rather stout pedicels 6 to 10 lines long; segments lanceolate, acuminate, gibbous at base, nearly twice longer than the stamens: ovary and capsule prominently 6-crested. — Blue Mountains, Oregon (John Day Valley), and S. Idaho; Rev. R. D. Nevius.

43. *A. TOLMIEI*, Baker. Scape 2 to 4 inches high: pedicels (20 to 30) slender, 4 to 6 lines long: flowers light rose-color with darker midvein, 4 lines long; segments lanceolate, acute, gibbous at base, a half longer than the stamens: ovary very obscurely crested. — Bot. Mag. under t. 6227. *A. Douglasii*, var.  $\beta$ , Hook. Fl. Bor.-Am. 2. 185, & t. 197 mainly. *A. tribracteatum*, Watson, l. c. 353, in part. S. Idaho (Snake County, Tolmie) and Utah (Parley's Park in the Wahsatch Mountains, Watson).

44. *A. LEMMONI*. Scape 6 inches high: leaves less falcate: flowers rather numerous, pale rose-color without darker midveins, 4 lines long, on pedicels 6 to 8 lines long; segments ovate-lanceolate, acuminate, gibbous, a little longer than the stamens: ovary-cells with a broad obscure crest on each side. — Sierra Nevada (Sierra County, J. G. Lemmon, 1874).

\* \* Spathe 3-5-valved: stamens exserted: ovary not crested.

45. *A. PLATYCAULE*. Scape 3 to 5 inches high and 2 to 4 lines broad: leaves 6 to 12 lines broad: spathe-valves acuminate: pedicels very numerous, an inch long or less: flowers rose-colored, 4 to 7 lines long; segments lanceolate, very narrowly long-acuminate. — *A. anceps*, Baker, Bot. Mag. t. 6227. Sierra Nevada (high valleys, Placer to Plumas Counties).

§ 4. Bulb an ovate coated corm, propagating by an offshoot from the lower part of the tall terete scape: leaves several, narrow, flat: spathe 2-valved: capsule not crested.

46. *A. UNIFOLIUM*, Kellogg. Bulb deep-seated, white, the somewhat chartaceous coat with a close contorted reticulation: scape stout, a foot or two high: flowers (10 to 30) bright rose-color, 5 to 7 lines long, on pedicels an inch long or more; segments ovate-lanceolate, acute or subacuminate, exceeding the stamens and style. — Proc. Calif. Acad. 2. 112, f. 35; Watson, l. c. 486, t. 36, f. 9, 10; Baker, Bot. Mag. t. 6320. Coast Ranges (Mendocino County to San Diego).

#### *Introduced Species, etc.*

*A. VINEALE*, Linn., is frequent in the Atlantic States, and is often mistaken for *A. Canadense*. It may be readily known by its leafy stem, terete leaves, and cuspidate filaments.

*A. CAROLINIANUM*, Red., is referred by Regel to *A. blandum*, probably correctly. It is not known in America.

*A. MACNABIANUM*, Regel (Gartenfl. 1874, 264, t. 770, fig. 2, 3), cultivated from bulbs probably collected in Oregon, cannot be identified from the description in Regel's Monographia Alliorum.

A. GLANDULOSUM, Link & Otto, is a species of Central and Northern Mexico, with dark purple flowers on slender pedicels; ovary acutish, but not crested; bulbs small, globose, the white coats without reticulation, propagating by a scaly offshoot from the base. The material at hand is too scanty for a satisfactory definition of the few doubtful Mexican species.

## 2. NOTHOSCORDUM, Kunth.

1. N. STRIATUM, Kunth. Bulb small, often bulbiferous at base: leaves a line or two broad: scape a foot high or often much less: flowers few, 4 to 6 lines long, on slender pedicels: capsule 2 lines long. — Baker, Saund. Ref. Bot. t. 304. *Ornithogalum bivalve*, Linn.? *Allium ornithogaloides*, Walt. *A. striatum*, Jacq. Icon. t. 366; Sims, Bot. Mag. t. 1035 and 1524. *A. ochroleucum*, Nutt. Fl. Ark. 156. *Pseudoscordum striatum*, Torr. & Gray, Pacif. R. Rep. 2. 176. Virginia to Nebraska and southward to Florida, New Mexico and Mexico. The synonymy of the genus is much confused.

## 3. MUILLA.

1. M. MARITIMA. Corm small, with fibro-membranous coats: leaves scabrous, a line wide or less: scape scabrous, very slender, 2 to 6 inches high or rarely more, with 4 to 6 linear bracts: pedicels (5 to 15) an inch long or less: perianth subrotate, the segments 2 or 3 lines long: anthers very small: capsule 3 lines long, with usually 3 seeds (10 ovules) in each cell. — *Hesperoscordium* (?) *maritimum*, Torr. Pacif. R. Rep. 4. 148. *Allium*, Benth. Pl. Hartw. 339; Regel; Wood; etc. *Milla*, Watson, King's Rep. 5. 354. *Nothoscordum*, Hook. f. Bot. Mag. under t. 5896. California (Marin County to Monterey) and W. Nevada, in saline localities.

## 4. BLOOMERIA, Kellogg.

1. B. AUREA, Kell. Corm small, at length fibrous-coated: leaves 3 to 6 lines broad: scape scabrous, 6 to 18 inches high: flowers numerous, on slender pedicels, subrotate, the segments 4 to 6 lines long: appendages of the filaments nearly a line long, with a terminal cusp of variable length, minutely papillose. — Proc. Calif. Acad. 2. 11. *Allium croceum*, Torr. Bot. Mex. Bound. 218. *Nothoscordum aureum*, Hook. f. Bot. Mag. t. 5896. S. California (Monterey to San Diego Counties).

## 5. BRODLÆA, Smith.

\* Stamens in one row on the throat; anthers basifixed: purplish perianth mostly broadly funnel-form, the tube shorter than the limb. — § EUBRODLÆA.

+ Stamens 3, opposite to the inner segments and alternate with as many staminodia: segments 2 or 3 times longer than the tube.

++ Pedicels (usually few) more or less elongated.

1. *B. GRANDIFLORA*, Smith. Leaves a line broad, subterete: scape 4 to 10 inches high: flowers an inch long: staminodia entire, obtuse, about equalling the linear anthers: filaments  $1\frac{1}{2}$  lines long or more: capsule oblong, narrowed at base, attenuate above; cells 6–8-seeded: seeds a line long. — Lindl. Bot. Reg. t. 1183; Hook. Bot. Mag. t. 2877; Baker, Journ. Linn. Soc. 11. 376, in part. *Hookera coronaria*, Salisb. Parad. t. 98. From the Mohave River to British Columbia.

Var. (?) MAJOR, Benth. Leaves flattened, 1 to 3 lines broad: scape stouter, a foot or two high, often scabrous: pedicels more numerous (6 to 20) and longer (1 to 4 inches): capsules usually with a broader base, and seeds 2 lines long. — Pl. Hartw. 339. *B. Californica*, Lindl. Trans. Hort. Soc. 4. 84, fig.

2. *B. MINOR*. Scape very slender, 3 to 6 inches high: flowers a half to one inch long: staminodia broad and usually emarginate, longer than the oblong anthers: capsule obovate, acute, 3 lines long; cells 3-seeded. — *B. grandiflora*, var. *minor*, Benth. Pl. Hartw. 340. California to Oregon.

3. *B. TERRESTRIS*, Kellogg. Leaves nearly terete: scape very short: pedicels very slender, 3 or 4 inches long: flowers 8 to 10 lines long: staminodia emarginate, yellow, exceeding the oblong sagittate anthers: capsule acute at base, a half-inch long; cells 6–8-seeded. — Proc. Calif. Acad. 2. 6. *B. grandiflora*, var. *macropoda*, Torr. Pacif. R. Rep. 4. 149. *B. Torreyi*, Wood, Proc. Philad. Acad. 1868, 172. Monterey to Mendocino County.

++ ++ Flowers subcapitate.

4. *B. CONGESTA*, Smith. Corm often deep-seated: scape 2 to 4 feet high, smooth: umbel often produced into a short dense raceme: flowers about 9 lines long: staminodia deeply cleft, exceeding the nearly sessile emarginate anthers: capsule ovate: seeds usually solitary, 2 lines long. — Trans. Linn. Soc. 10. 3, t. 1. *Dichelostemma*, Kunth, Enum. 4. 470. San Francisco to Washington Territory.

5. *B. MULTIFLORA*, Benth. Corm less deeply seated: scape 1 or 2 feet high, somewhat scabrous: umbel not produced: staminodia broad, entire, obtuse, about equalling the anthers: seeds several in each cell:

otherwise as the last. — Pl. Hartw. 339; Hook. f. Bot. Mag. t. 5989. *B. parviflora*, Torr. & Gray, Pacif. R. Rep. 2. 125. *B. grandiflora*, var. *brachypoda*, Torr., same, 4. 149. Sacramento Valley to Oregon and in the Sierra Nevada.

+ + Stamens 6, those opposite the inner perianth-segments with their short filaments conspicuously wing-appendaged: segments little longer than the tube: flowers subcapitate.

6. *B. CAPITATA*, Benth. Scape usually 1 or 2 feet high: flowers 6 to 10 lines long: outer filaments dilated at base; inner anthers linear, little shorter than the oblong-lanceolate wings: capsule ovate, 3 lines long; cells several-seeded. — Pl. Hartw. 339. *Hookera pulchella*, Salisb. Parad. t. 117? *Dichelostemma capitata*, Wood, l. c. 173. *Milla capitata*, Baker, l. c. 381. California to Utah.

\* \* Stamens in 2 rows (except in n. 8), with more or less distinctly versatile anthers and naked filaments: capsule stipitate: perianth-segments equalling or shorter than the mostly narrow tube. — § SEUBERTIA.

+ Perianth broadly funnel-form: flowers subcapitate.

7. *B. DOUGLASII*. Scape 1 or 2 feet high: flowers few or many, blue, 8 to 12 lines long: anthers a line long, the lower on the throat, the upper on the inner perianth-segments; filaments short. — *Triteleia grandiflora*, Lindl.; Hook. Fl. Bor.-Am. 2. 186, t. 198, B. *Brodiaea grandiflora*, Torr. in Stansb. Rep. 397. *Milla grandiflora*, Baker, l. c. Washington Territory and Oregon to Wyoming and Utah.

+ + Perianth more or less attenuate at base: umbel open.

+ + Flowers blue or purplish; rarely white.

8. *B. BRIDGESII*. Scape a foot high or more; flowers 12 to 15 lines long, the very narrow tube exceeding the segments: filaments deltoid, in one row on the throat; anthers linear, 2 lines long: capsule ovate, shorter than the stipe, beaked by the very slender style: seeds 2 or 3 in each cell. — Central California (foothills of the Sierra Nevada; Bridges, n. 338; and others).

9. *B. LAXA*. Scapes 6 inches to 2 feet high, smooth or scabrous: flowers few to many, 12 to 20 lines long, the very narrow tube equaling or exceeding the segments: filaments very slender, short or elongated, the upper on the throat opposite the inner segments: capsule oblong, long-stipitate; style rather short: seeds several. — *Triteleia laxa*, Benth. Trans. Hort. Soc. 1. 413, t. 15, f. 2; Lindl. Bot. Reg. t. 1685. *Seubertia*, Kunth. *Milla*, Baker. Coast Ranges, from San Francisco to Humboldt County.

10. *B. PEDUNCULARIS*. Scape 1 or 2 feet high, smooth: flowers smaller (6 to 9 lines long), on very slender pedicels, the segments a

little longer than the turbinate tube: lower anthers sessile, the upper on short filaments: capsule on a stipe 1 or 2 lines long. — *Triteleia*, Lindl. Bot. Reg. under t. 1685. *Milla*, Baker. Coast Ranges of Central California.

++ ++ Flowers yellow, with brown nerves.

11. *B. CROCEA*. Leaves 2 to 6 lines broad: scape a foot high or more, smooth: bracts linear, elongated: flowers 7 to 9 lines long, on pedicels 2 inches long or less, the segments a little exceeding the turbinate tube: anthers small (a line long), on short slightly dilated filaments: ovary pubescent on the angles: capsule obovate, abruptly narrowed above, shortly stipitate; cells 4-seeded. — *Seubertia*, Wood, l. c. 171. *Milla*, Baker. Siskiyou County.

12. *B. GRACILIS*. Leaf solitary, 1 to 3 lines broad: scape 2 to 4 inches high, purplish, scabrous: bracts short, lanceolate: flowers 5 to 7 lines long, on pedicels 6 to 12 lines long, the segments about equaling the narrow tube: anthers very small, on very slender elongated filaments: capsule ovate-oblong, attenuate above, on a slender stipe; cells 2-seeded. — On Spanish Peak, Plumas County; collected by Mrs. R. M. Austin.

\* \* \* Stamens in one row, with deltoid or wing-dilated filaments and versatile anthers: capsule stipitate: perianth-segments twice longer than the turbinate tube. — § *CALLIPRORA*. [See p. 301.]

13. *B. IXIODES*. Scape 3 inches to 2 feet high, usually scabrous: flowers few to many, on pedicels 1 to 4 inches long, yellow more or less tinged with purple or nearly white (the brown midvein often double or triple), 5 to 10 lines long: filaments winged their whole length, bicuspidate above; anthers small: capsule ovate-oblong; stipe 2 or 3 lines long. — *Ornithogalum ixioides*, Ait. f. Hort. Kew. 2. 257. *Calliprora lutea*, Lindl. Bot. Reg. t. 1590; Hook. Bot. Mag. t. 3588. *Themis ixioides*, Salisb. *Calliprora aurantea*, Kellogg, Proc. Calif. Acad. 2. 20. *Milla ixioides*, Baker. From Santa Barbara to Oregon.

14. *B. LACTEA*. Scape usually 1 or 2 feet high, smooth or scabrous: flowers few to many, on slender pedicels 2 inches long or less, white with green midvein or sometimes purplish, 4 or 5 lines long: filaments deltoid, a line long; anthers small: capsule subglobose; stipe a line or two long. — *B. grandiflora*, Pursh. *Hesperoscordum lacteum* and *hyacinthinum*, Lindl. Bot. Reg. t. 1639. *Allium lacteum*, Benth. Pl. Hartw. 339. *H. Lewisii*, Hook. Fl. Bor.-Am. 2. 185, t. 198. *Veatchia crystallina*, Kellogg, l. c. 2. 11. *Milla hyacinthina*, Baker. *Allium Tilingi*, Regel, All. Monogr. 124. Coast Ranges and Sierra Nevada from Monterey to British Columbia.

Var. LILACINA. A stout form, with large flowers, from white becoming more or less tinged with lilac. — Mendocino and Humboldt Counties.

## 6. STROPHOLIRION, Torr.

1. S. CALIFORNICUM, Torr. Scape lax or often twining, 2 to 12 feet long, scabrous: pedicels (15 to 30) an inch long or less: flowers 5 or 6 lines long, with oblong-lanceolate segments: anthers equalling the narrow emarginate white staminodia and the lanceolate acute wings of the filaments (2 lines long): capsule shorter than the perianth. — Pacif. R. Rep. 4. 149, t. 23. *Rupalleya volubilis*, Morière, Bull. Soc. Norm. 8. 313, t. *Dichelostemma Californica*, Wood, Proc. Acad. Philad. 1868, 173. *Brodiaea volubilis*, Baker, Journ. Linn. Soc. 11. 177; Hook. f. Bot. Mag. t. 6123. Foothills of the Sierra Nevada (Mariposa County and northward).

## 7. BREVOORTIA, Wood.

1. B. COCCINEA. Scape erect, 1 to 3 feet high, with reddish bracts: pedicels (6 to 15) an inch long or less: flowers 12 to 16 lines long, with ovate segments 2 or 3 lines in length: anthers equalling the limb; staminodia a half shorter, yellow: capsule as long as the perianth, on a stipe 2 or 3 lines long. — *B. Ida-Maia*, Wood, Proc. Acad. Philad. 1867, 82. *Brodiaea coccinea*, Gray, Proc. Amer. Acad. 7. 389; Baker, Journ. Linn. Soc. 11. 378; Hook. f. Bot. Mag. t. 5857. N. California (Humboldt to Shasta Counties).

## 8. ANDROSTEPHIUM, Torr.

1. A. VIOLACEUM, Torr. Scape 2 to 6 inches high: flowers 8 to 12 lines long or more, usually exceeding the stout pedicels; tube nearly as long as the limb: crown scarcely shorter than the limb, the lobes exceeding the anthers. — Bot. Mex. Bound. 218. *Milla cærulea*, Scheele, Linnæa, 25. 260. W. Kansas to Texas.

2. A. BREVIFLORUM, Watson. Scape usually stouter, 3 to 12 inches high: flowers half an inch long, mostly shorter than the pedicels, and the tube much shorter than the limb: lobes of the crown shorter than the anthers. — Amer. Naturalist, 7. 303. S. Utah to S. E. California.

The Mexican genus BESSERA, of a single species (*B. ELEGANS*, Schult.), is closely allied to *Androstephium*; flowers bright scarlet, the more spreading segments closely 3-nerved; the elongated filaments and style exerted.



## 9. MILLA, Cav.

1. *M. BIFLORA*, Cav. Corm small, membranous-coated: leaves subterete, very rough: scape smooth, 2 to 12 inches high, bearing 1 to 5 nearly equal elongated pedicels (3 to 6 inches long): perianth  $1\frac{1}{2}$  to 2 inches long, the broadly oblong-lanceolate segments (the inner narrower) about twice longer than the tube. — Icon. 2. 76, t. 196; Lindl. Bot. Reg. t. 1555. *Diphalangium graminifolium*, Schauer, Linnæa, 19. 702. From S. Arizona and New Mexico to Central Mexico.

## 10. LEUCOCRINUM, Nutt.

1. *L. MONTANUM*, Nutt. Leaves several, rather thick, 1 to 3 lines broad: flowers (4 to 8) on pedicels  $\frac{1}{2}$  to  $1\frac{1}{2}$  inches long, the very slender tube an inch or two long: capsule truncate, 3 or 4 lines long, with 4 to 6 seeds in each cell. — Gray, Ann. N. Y. Lyc. 4. 110; Watson, King's Rep. 5. 349, t. 36, f. 1-3. *Weldenia*, Endl. Gen. Pl. 1358. Colorado to N. California, in sandy valleys.

The Mexican *WELDENIA CANDIDA* is known only from the description and figure by Schult. f. (in Regensb. Flora (1829), 12. 1, t. 1, and Syst. 7. 1136), based upon a single imperfect specimen collected by Karwinsky in the mountains near Toluca ("Nevada de Toluca"). It is represented as differing from *Leucocrinum* mainly in its broader and short leaves, perianth-segments only three, and anthers extrorse.

## 11. CAMASSIA, Lindl.

1. *C. ESCULENTA*, Lindl. Scape stout, a foot or two high: leaves 3 to 8 lines broad: pedicels rather stout, mostly shorter than the usually dark-blue flowers: perianth-segments 7 to 15 lines long, scarcely exceeding the style, a little longer than the stamens: anthers a line or two long: ovules 16 to 18 in each cell: capsule oblong-obovate, somewhat narrowed at base, rather obtusely angled, 6 to 12 lines long. — Bot. Reg. t. 1486; Fl. Serres, t. 275; Baker, Journ. Linn. Soc. 13. 256. *Phalangium Quamash*, Pursh. *Scilla esculenta*, var., Hook. Bot. Mag. t. 2774, the white-flowered form, which is also *Chlorogalum Leichtlinii*, Baker, Gard. Chron. 1874, 689, and *Camassia esculenta*, var. *Leichtlinii*, Baker, Bot. Mag. t. 6287. British Columbia to California and Utah.

2. *C. FRASERI*, Torr. Pedicels more slender and often exceeding the smaller (4 to 7 lines long) light-blue flowers: ovules 6 to 9 in each cell: capsule very broadly triangular-globose, acutely angled, 3

or 4 lines long.—Pacif. R. Rep. 4. 147 (and 2. 176); Baker, l. c. *Phalangium esculentum*, Nutt. in Fras. Cat. 1813. *Scilla esculenta*, Ker, Bot. Mag. t. 1574. *Anthericum esculentum*, Schultes. *Lemotrys hyacinthina*, Raf. *Scilla Fraseri*, Gray. From Pennsylvania to Iowa and Texas.

Var. *ANGUSTA*, Torr. l. c. Very slender and the leaves narrow (3 or 4 lines broad): flowers still smaller, 3 or 4 lines long.—*Scilla angusta*, Engelm. & Gray, Pl. Lindh. 29. Louisiana and Arkansas to Texas.

## 12. HESPERANTHES.

1. *H. TORREYI*. Roots thick, cylindrical: stem slender, 1 to 3 feet high, naked or with 1 or 2 setaceous leaves; radical leaves several, elongated, smooth, a line or two wide: raceme simple or branched, loosely flowered; pedicels half an inch long or less: flowers yellow with brownish nerves, 5 or 6 lines long: filaments slightly roughened: capsule 6 lines long, the cells 12–16-seeded.—*Echeandia terniflora*, var. (?) *angustifolia*, Torr. Bot. Mex. Bound. 219. *Anthericum Torreyi*, Baker, Journ. Linn. Soc. 15. 317. *Echeandia terniflora*, Rothr. in Wheel. Rep. 6. 269. W. Texas to Arizona.

### *Mexican Species.*

2. *H. LEPTOPHYLLA*. Roots elongated, thickened below: stem slender, a foot high or more: leaves numerous, short and very narrow, scabrous on the margin: flowers yellowish, 5 lines long; filaments very rough: capsule shorter.—*Echeandia leptophylla*, Benth. Pl. Hartw. 25. *Anthericum*, Baker, l. c.

3. *H. STENOCARPA*. Stem rather stout, a foot high or more, simple or strictly branched, with 2 or 3 broad leaves: radical leaves several, elongated, smooth, 3 or 4 lines broad: flowers 6 to 8 lines long, on stout erect pedicels: filaments coarsely muricate: capsule 6 lines long, the cells 30–40-seeded.—*Anthericum stenocarpum*, Baker, l. c.

4. *H. SCABRELLA*. Roots thickened, an inch long: stem 6 to 12 inches high, simple or scarcely branched, puberulent or glabrous, few-flowered: leaves short, glabrous except the scabrous-ciliolate margin, 3 or 4 lines broad: flowers 6 lines long, on stout erect pedicels: filaments slightly muricate: capsule 5 lines long, the cells about 12-seeded.—*Phalangium scabrellum*, Benth. Pl. Hartw. 293. *Anthericum*, Baker, l. c. The other species described by Mr. Baker (*Anthericum flavescens*, Schult., and *A. Skinneri*, Baker), I have not seen.

ECHEANDIA, Ort., is a very similar Mexican genus, distinguished by linear anthers longer than the short filaments and connivent over the ovary. Mr. Baker recognizes one rather variable species, *E. TERNIFLORA*, Ort., which has not been collected within the United States.

### 13. SCHÆNOLIRION, Torr.

1. *S. CROCEUM*, Gray. Stem very slender, a foot high: raceme simple, short (1 to 4 inches): bracts ovate, mostly obtuse, purplish: flowers yellow tinged with red; segments narrow,  $2\frac{1}{2}$  to 3 lines long: seed nearly 2 lines long.—*Amer. Naturalist*, 10. 427. *Phalangium croceum*, Michx. *Anthericum croceum* and *Nuttallianum*, Schult. f. *Syst.* 7. 476. *Amblostima crocea*, and *Oxytria crocea*, Raf. *Fl. Tellur.* 26. *Ornithogalum* (?) *croceum* and *Nuttallianum*, Kunth, *Enum.* 4. 371. Georgia to Florida.

2. *S. TEXANUM*, Gray, l. c. Resembling the last, but flowers greenish white: bracts narrower, acutish: seed a line long.—*Ornithogalum Texanum*, Scheele, *Linnæa*, 23. 146. *S. Michauxii*, Torr. *Bot. Mex. Bound.* 220, excl. syn. and descr. Texas and Louisiana.

3. *S. ELLIOTTII*, Feay. Stem stouter, 2 feet high, less thickened at base; racemes usually paniced, becoming 2 to 4 inches long: bracts acute or acuminate: flowers white, with oval 5-nerved segments, 2 or 3 lines long: capsule coriaceous, and seed nearly 2 lines long.—Gray, l. c. *Ornithogalum croceum*, Elliott. *Amblostima albiflora* and *latifolia* (?), Raf. l. c. *S. Michauxii*, Torr. l. c., mainly. *Anthericum croceum*, Baker, *Journ. Linn. Soc.* 15. 297. Georgia and Florida.

### 14. HASTINGSIA.

1. *H. ALBA*. Stem 2 or 3 feet high, often stout: leaves 2 to 6 lines broad: raceme simple or sparingly branched, densely many-flowered (often a foot long): pedicels a line long or less: bracts narrowly acuminate: flowers 2 or 3 lines long, often tinged with green or pink.—*Schœnolirion album*, Durand, *Journ. Acad. Philad.* 2. 3. 103; Gray, *Amer. Naturalist*, 10. 552. Northern California (Plumas to Humboldt Counties and northward).

### 15. CHLOROGALUM, Kunth.

\* Perianth-segments narrowly ligulate, spreading widely from the base in the open flower: pedicels nearly equalling the flowers.

1. *C. POMERIDIANUM*, Kunth. Bulb large, thickly coated with coarse brown fibres: stem and spreading panicle 1 to 3 feet high:

leaves 4 to 10 lines broad: flowers white, purple-veined, 8 to 10 lines long, on spreading pedicels 2 to 9 lines long: capsule 3 lines long. — Torr. Bot. Mex. Bound. t. 60; Baker, Journ. Linn. Soc. 13. 291. *Anthericum*, Ker, Bot. Reg. t. 564. *Scilla*, DC.; Red. Lil. t. 421. *Phalangium*, Don, Sweet's Fl. Gard. 2 ser. t. 381. *Ornithogalum divaricatum*, Lindl. Bot. Reg. 28, t. 28. *C. divaricatum*, Kunth. California (valleys and foothills, from the Upper Sacramento to Tuolumne County and Santa Barbara).

\* \* Perianth-segments oblong-oblancoate, spreading from above the base: pedicels very short.

2. *C. PARVIFLORUM*. Bulb smaller (an inch thick), with dark membranous coats: stem 2 or 3 feet high, with slender divaricate branches: leaves grass-like (2 or 3 lines broad): pedicels rarely a line or two long, mostly shorter than the bracts: flowers pinkish, 3 or 4 lines long: ovary broad and obtuse: capsule smaller (scarcely 2 lines in diameter). — S. California (Cajon Valley, near San Diego; D. Cleveland, 1877).

3. *C. ANGUSTIFOLIUM*, Kellogg. Resembling the last: flowers white with yellowish-green lines, 3 to 6 lines long, narrow at base; the ovary being oblong-ovate, acutish above, and shortly stipitate. — Proc. Calif. Acad. 2. 105, fig. 30. California (Shasta County, Kellogg; near Yuba, A. Wood).

## 16. ODONTOSTOMUM, Torr.

1. *O. HARTWEGI*, Torr. Stem a foot or two high, branching from the ground: corm deep-seated, an inch in diameter: leaves rather short, flat or somewhat undulate, 4 to 6 lines wide: racemes loosely many-flowered; bracts and bractlets very narrow: pedicels usually very slender and exceeding the bracts: flowers 4 to 6 lines long; segments of the limb oblong: style equalling the tube: capsule nearly 2 lines long. — Bot. Mex. Bound. 150, t. 24; Baker, Journ. Linn. Soc. 11. 436. Foothills of the Sierra Nevada (Butte to Amador Counties).

## 17. CONVALLARIA, Linn.

1. *C. MAJALIS*, Linn. Leaves broadly elliptic to oblanceolate, exceeding the angular scape: perianth 3 lines long and nearly as broad: berry 3 or 4 lines in diameter. — Alleghanies (Virginia to S. Carolina); apparently identical with the plant of Europe and Asia (or lobes narrower and more acute?).

## 18. POLYGONATUM, Tourn.

1. *P. BIFLORUM*, Ell. Stem slender, usually decinate,  $1\frac{1}{2}$  to 3 feet high: leaves ovate-lanceolate to lanceolate, mostly narrow at base, 2 to 4 inches long, pubescent beneath: pedicels jointed at or very near the base of the flower, 3 to 6 lines long, naked: flowers 1 or 2 (rarely 3) at each axil, 4 to 6 lines long. — *Convallaria biflora*, Walt. *C. pubescens*, Willd. Hort. Berol. t. 45. *C. canaliculata*, Muhl.; Willd. l. c. *P. angustifolium*, *canaliculatum*, *pubescens*, *multiflorum* and *hirtum*, Pursh. Canada (New Brunswick to Winnipeg Valley) to Florida; wooded hillsides.

2. *P. GIGANTEUM*, Dietr. Glabrous throughout: stem somewhat curved, 2 to 7 feet high: leaves broadly ovate to lanceolate, usually clasping by a broad base, 3 to 8 inches long: pedicels jointed below ( $\frac{1}{2}$  to 1 line or more) the base of the flower,  $\frac{1}{2}$  to 3 inches long including the common peduncle, frequently with narrow bracts: flowers 1 to 10 or more, 5 to 9 lines long. — Otto, Gartenz. 1835, 222. *Convallaria commutata*, Schult. Syst. 7. 1671. *P. commutatum* and *P. parviflorum*, Dietr. l. c. *P. latifolium*, var. *commutatum*, Baker, Journ. Linn. Soc. 14. 555, chiefly. New England to Lake Winnipeg and the Upper Missouri, and from Virginia to New Mexico; meadows and river-banks. Neither *P. latifolium* nor *P. multiflorum* is American, though the latter is frequent in cultivation; both have the pedicel jointed at the base of the flower.

## 19. SMILACINA, Desf.

\* Flowers on very short pedicels in a terminal racemose panicle: stamens exceeding the small (a line long) oblong-lanceolate segments: ovules collateral.

1. *S. RACEMOSA*, Desf. More or less pubescent: rootstock stout: stem 1 to 3 feet high, somewhat flexuous: leaves oblong-lanceolate, mostly narrowly acuminate, abruptly short-petioled: style very short: berry reddish, purple-dotted, 3 lines broad, usually 1-seeded: seed whitish, 2 lines in diameter. — Ann. Mus. Par. 9. 51; Torr. Fl. N. York, 2. 298, t. 130. *Convallaria racemosa*, Linn.; Sims, Bot. Mag. t. 899. *Tovaria*, Necker; Baker, Journ. Linn. Soc. 14. 570. *Polygonastrum*, Moench. *Maianthemum*, Link. *S. ciliata*, Desf. l. c., t. 9. New Brunswick to Winnipeg Valley, south to S. Carolina and Arkansas.

2. *S. AMPLEXICAULIS*, Nutt. Similar: leaves ovate to lanceolate, rarely at all acuminate, mostly sessile and clasping at base: style

longer, nearly equalling the ovary: seed smaller. — Journ. Philad. Acad. 7. 58. *S. racemosa*, var. *amplexicaulis*, Watson, King's Rep. 5. 345. *Tovaria racemosa*, Baker, l. c. in part. British Columbia to California (Monterey) and east to Wyoming and New Mexico.

\* \* Flowers larger, on solitary pedicels in a simple few-flowered open raceme: stamens included: ovules not collateral.

+ Leaves (7 to 12) sessile: raceme sessile or nearly so: berry blue-black.

3. *S. STELLATA*, Desf. l. c. Glabrous or pubescent: stem a foot high or less: leaves lanceolate, acutish, sessile and closely clasping, usually ascending and folded: raceme about an inch long: perianth-segments 2 or 3 lines long, exceeding the pedicels: berry 3 lines broad: seeds brown. — *Convallaria stellata*, Linn.; Sims, Bot. Mag. t. 1043. *Tovaria*, Necker; Baker, l. c. 565. *Maianthemum*, Link. *Asteranthemum vulgare*, Kunth. Labrador to E. Oregon and N. E. California, south to Pennsylvania, Iowa and New Mexico: the Norway plant appears to be the same.

4. *S. SESSILIFOLIA*, Nutt. in herb. Rootstock slender: stem a foot or two high: leaves lanceolate, acuminate, sessile, usually flat and spreading, somewhat puberulent: raceme larger, the pedicels 2 to 7 lines long: flowers often larger: berry 3 to 5 lines in diameter. — *Tovaria sessilifolia*, Baker, l. c. 566. California (Monterey) to British Columbia and east to the Wahsatch; has been usually referred to *S. stellata*.

+ + Leaves (2 to 4) sheathing the low stem: raceme pedunculate: berry red.

5. *S. TRIFOLIA*, Desf. l. c. Glabrous, 2 to 6 inches high: leaves oblong, narrowed below, acute: pedicels exceeding the flowers, which are  $1\frac{1}{2}$  lines long: berry 2 to 3 lines in diameter. — *Convallaria trifolia*, Linn.; Gmel. Fl. Sib. 1. 36, t. 6. *Tovaria*, Necker; Baker, l. c. 565. *Maianthemum*, Raf. *Asteranthemum*, Kunth. Labrador to New England, Michigan and the Saskatchewan; also in E. Siberia.

### *Species of Mexico, &c.*

\* Flowers solitary, paniculate: stamens included.

6. *S. PANICULATA*, Mart. & Gal. Leaves 7 to 9, broadly lanceolate: flowers large, on elongated pedicels in a dense compound corymb. — Central Mexico and Guatemala.

7. *S. THYRSOIDEA* (*Tovaria*, Baker). Leaves 10 to 15, lanceolate, often narrow, long-acuminate: flowers smaller, on short pedicels in a large open spreading panicle. — Central Mexico.

8. *S. NERVULOSA* (*Tovaria*, Baker). Leaves 5 or 6: panicle

oblong, small, with few divaricate branches: flowers small (2 lines broad), on very short pedicels: style very short. — Jalapa.

9. *S. LAXIFLORA* (*Tovaria*, Baker). Leaves 6 to 9: panicle deltoïd, with ascending branches: flowers twice larger, on pedicels 3 to 6 lines long: style as long as the ovary. — Guatemala.

\* \* Flowers mostly fascicled in a simple raceme.

10. *S. SCILLOIDES*, Mart. & Gal. Leaves 6 or 8, narrowly oblong: raceme straight: flowers small: style as long as the ovary. — Central Mexico.

11. *S. FLEXUOSA*, Bertol. Leaves 10 or 12, oblong to ovate: raceme very flexuous: flowers large: style twice longer than the ovary. — Guatemala.

## 20. MAIANTHEMUM, Weber.

1. *M. CANADENSE*, Desf. Pubescent or glabrous, 3 to 5 inches high: leaves lanceolate to ovate, cordate at base with a narrow sinus, sessile or very shortly petioled: perianth-segments a line long: style slender, as long as the ovary: berry  $1\frac{1}{2}$  to 2 lines in diameter: seeds light-colored, scarcely over a line thick. — Ann. Mus. Par. 9. 52; DC. in Red. Lil. t. 216, f. 1. *Smilacina Canadensis*, Pursh; Bart. Fl. N. Am. t. 70. *Convallaria Canadensis*, Poir. *Smilacina bifolia*, var. *Canadensis*, Gray. Labrador to the Saskatchewan, south to Iowa, Illinois and N. Carolina.

2. *M. BIFOLIUM*, DC. Low and slender, somewhat pubescent: leaves ovate-cordate with a broad sinus, the lower rather abruptly acute and with a petiole  $\frac{1}{2}$  to an inch long, the upper more attenuate and petiole shorter: style long and slender: berry 2 lines in diameter, 1-2-seeded: seed brown, a line thick. — Var. (?) *DILATATUM*, Wood. Stouter (6 to 12 inches high), glabrous: leaves broader, the lower subreniform-cordate with petioles often 2 inches long or more: flowers rather larger: style shorter, stout: berry larger, 2-4-seeded: seed brownish,  $1\frac{1}{2}$  lines thick. — Proc. Philad. Acad. 1868, 174. *Smilacina dilatatum*, Nutt. in herb. California (Marin County) to Alaska. Apparently connected with the typical form by var. *Kamschaticum* of Eastern Siberia, with slender style. The present form seems to recur also in Japan.

## 21. NOLINA, Michx.

\* Fruit somewhat inflated, the cells not burst by the ripening seed.

1. *N. GEORGIANA*, Michx. Stem slender from a thick rhizome, 1 to 3 feet high, including the simple sparingly branched panicle:

leaves flat, shorter than the stem, about a line wide, the cauline small and subfiliform: bracts subtending the branches of the panicle very small: fruit obcordate in outline, 3 lines long, on a pedicel 4 lines long. — Fl. 1. 208; Baker, Journ. Linn. Soc. 13. 292. *Phalangium virgatum*, Poir. in Lam. Dict. 5. 246. S. Carolina to Florida (Tampa Bay and St. Augustine). Specimens from the last locality have thicker fruit, only 2 lines long, on very short pedicels.

2. N. LINDHEIMERIANA. Stem stout, 2 to 6 feet high, from a very short caudex: leaves flat and thin, 2 to 4 lines broad below, 1 to 3 feet long, strongly serrulate; the cauline 6 inches long: panicle simple or sometimes compound, the bracts not conspicuous: fruit very thin, emarginate at both ends (more deeply above), wider than long (5 lines broad), on pedicels about 4 lines long. — *Dasyllirion Lindheimerianum*, Scheele, Linnæa, 25. 262. *D. tenuifolium*, Torr. Bot. Mex. Bound. 215. *Beaucarnea Lindheimeriana*, Baker, Trim. Journ. Bot. 10. 328. Texas.

3. N. MICROCARPA. Stem stout, 6 feet high, from a short caudex: leaves concavo-convex, rather thick and somewhat carinate, 4 to 6 lines broad, very strongly serrulate, fibro-lacerate at the apex: panicle narrow, branched at base; branches slender, a foot long, with ascending branchlets (2 or 3 inches long); bracts small: fruit as in the last but smaller (3 lines broad), on very slender pedicels 2 or 3 lines long: stigmas very short, sessile. — *Dasyllirion erumpens*, Rothr. in Wheeler's Rep. 6. 272. S. Arizona (Rock Cañon; Rothrock, n. 278). Resembling *N. erumpens*: only immature fruit known.

4. N. BIGELOVIL. "Scape 3 feet high": leaves flat, nearly an inch wide above the broad deltoid base, not carinate, 3 or 4 feet long, the margin roughish: panicle compound; branchlets slender, an inch or two long: fruit very thin, 4 or 5 lines in diameter, emarginate at both ends, on very slender pedicels 2 to 4 lines long: seed ovate-oblong, 2 lines long, whitish, slightly reticulated. — *Dasyllirion Bigelovii*, Torr. Pacif. R. Rep. 4. 151. *Beaucarnea Bigelovii*, Baker, l. c. 326. W. Arizona. The plant found by Schott in Sonora, referred to this species in Bot. Mex. Bound. 216, is probably distinct, but has not been seen for comparison.

5. N. PARRYI. Resembling the last: caudex 3 to 6 feet high: leaves thicker and somewhat concave above, especially toward the stout apex, very strongly serrulate on the margin: branchlets of the panicle and the pedicels stouter: fruit 6 lines in diameter: seed subglobose, the very thin testa finely and irregularly wrinkled. — California (western border of San Bernardino Desert; Parry, 1876).



\* \* Seed bursting the cell before maturity and remaining exposed.

6. *N. TEXANA*. Stems very short, a foot or two high including the panicle, several from a very short caudex: leaves covering the ground, a line or two broad, concavo-convex below, triangular toward the apex, 2 to 4 feet long, roughish on the margins: panicle compound, the main bracts large and foliaceous with dilated bases: capsules 2-3 lines broad before rupture, on pedicels 2 or 3 lines long: seed globose, nearly smooth, 2 lines in diameter. — Texas (Austin to the Nueces; n. 550, 712, Lindheimer; n. 692, Wright; n. 635, Hall). Flowering in March; in fruit in May. Referred to the Mexican *Beaucarnea Hartwegiana* by Baker, l. c.

7. *N. ERUMPENS*. Stem 2 to 5 feet high, somewhat rough-scabrous: leaves thick, concavo-convex and somewhat carinate, half an inch broad above the base, 2 or 3 feet long, very strongly serrulate: panicle compound, with large dilated bracts; partial panicles pyramidal, 6 inches long, with the lower subdivaricate branchlets 2 or 3 inches long: stigmas linear, distinct, sessile: pedicels 2 lines long or less. — *Dasyllirion erumpens*, Torr. Bot. Mex. Bound. 216. *Beaucarnea*, Baker, l. c. 326. Western Texas (between the Rio Pecos and the Rio Grande).

8. *N. PALMERI*. Stem glabrous: leaves probably flat and broad, very strongly serrulate: panicle compound, 3 feet long and narrow, the partial panicles only 3 inches long or less, and the branchlets an inch long; bracts similar: stigmas upon a short style: fruit 2 lines broad before rupture, on pedicels 2 lines long: seeds globose, with minutely wrinkled testa. — Lower California (Tantillas Mountains; Palmer, 1875).

9. *N. HUMILIS*. Stems stout, very short (a foot high or less, including the panicle), clustered, from a subterranean rootstock: leaves 2 feet long, 2 to 4 lines broad at base, becoming very narrow, more or less channelled above and usually carinate beneath, triangular toward the apex, very rough on the margin: panicle 4 to 6 inches long, with simple suberect branches, dense: flowers large, the segments  $1\frac{1}{2}$  lines long: capsule equalling the pedicel, 3 lines long before rupture, thin-membranous: seed obovate, 3 lines long, with a white smooth thick and subcrustaceous testa. — Among rocks, San Luis Mountains, Mexico; Parry & Palmer (n. 874, 875).

The remaining Mexican species of *Beaucarnea*, described by Mr. Baker, l. c., are doubtless all to be referred to this genus, but are very imperfectly known.

## 22. DASYLIRION, Zucc.

1. *D. TEXANUM*, Scheele. Caudex 2 to 5 feet high, bearing a dense rosette of leaves and a flowering stem 8 or 10 feet long: leaves light-green, 3 or 4 feet long, 4 or 5 lines broad below and attenuate upward, splitting into coarse fibres at the apex, the serrulate margin armed with hooked teeth a line long and 3 to 6 lines apart; the dilated base narrowed gradually into the leaf, entire: panicle 2 or 3 feet long, very narrow; the partial panicles erect or suberect and about 3 inches long, equalling the broad subtending bracts; racemes an inch or two long, ascending: floral bractlets broadly ovate, acute, lacerately toothed, about a line long: perianth a line long: fruit 3 to  $3\frac{1}{2}$  lines long, on pedicels a line long, broadly elliptical, the rather narrow wings continued above and adnate to the style (or attenuate apex of the body) its whole length: seed (immature)  $1\frac{1}{2}$  lines long, acute at both ends. — Linnæa, 23. 140. *D. graminifolium*, Baker, Trim. Journ. Bot. 10. 297, mainly. W. Texas and Eastern New Mexico.

2. *D. WHEELERI*, Watson. Similar in size (12 to 14 feet high) and habit: leaves 7 to 9 lines broad, with brown-tipped teeth: racemes longer (2 to 4 inches), flexuous and usually pendent: fruit narrowly obcordate, 4 lines long, on pedicels a line or two long, the wings adnate only to the base of the style and prolonged above it in divergent obtuse lobes a line long: seed 2 lines long, acutish. — Rothrock, Wheeler's Rep. 6. 379. *D. graminifolium*, Rothr. l. c. 6. 272. S. Arizona (Bischoff; Rothrock, n. 329, 655) and southwestern New Mexico (Emory).

*Mexican Species.*

3. *D. BERLANDIERI*. Only the fruiting panicle known. Racemes stout, spreading, 2 inches long: floral bracts equalling or exceeding the pedicels, 2 or 3 lines long, broadly lanceolate, acute, nearly entire: perianth-segments 2 to  $2\frac{1}{2}$  lines long: fruit very broadly winged (sub-orbicular); summits of the wings broad and divergent, the free portion of the style and the stigmas a line long. — N. E. Mexico (Nuevo Leon, Berlandier, n. 3218).

4. *D. GRAMINIFOLIUM*, Zucc. Resembling *D. Texanum*; base of the somewhat shorter glaucous leaves abruptly contracted and spine-toothed above: staminate spikes thicker: body of the fruit less attenuate above and wings free from the style. — Collected in flower and fruit by Parry & Palmer (n. 876) in the mountains near San Luis Potosi.

5. *D. ACROTRICHUM*, Zucc. Described as resembling the last, with panicle narrower and the floral bractlets entire. Fruit not known. — Baker, l. c.

6. *D. SERRATIFOLIUM*, Zucc. A similar species, imperfectly known; leaves not breaking up into fibres at the end. — Baker, l. c. 298.

7. *D. LAXIFLORUM*, Baker, l. c. 299. Leaves also not fibre-tipped: panicle ovate-thyrsoïd. Female flowers and fruit unknown.

8. *D. QUADRANGULATUM*. Caudex 3 feet high: leaves drooping, dark green, 2 feet long or more, 2 or 3 lines broad at base, soon narrower and quadrangular (nearly square in section), unarmed, scabrous: scape about 5 feet high; inflorescence narrow: flowers  $1\frac{1}{2}$  lines long, on very short pedicels: fruit  $3\frac{1}{2}$  to 5 lines long, the broad wings produced upward to the summit of the slender style: stigma-lobes spreading: seed 2 lines long. — Sierra Nola, Tamaulipas; Dr. E. Palmer, 1878: a very peculiar species.

### 23. *HESPEROCALLIS*, Gray.

1. *H. UNDULATA*, Gray. Bulb large: stem stout, leafy, a foot or two high, 5-8-flowered: leaves linear, fleshy, carinate, 3 to 6 lines wide, the margin undulate: flowers  $1\frac{1}{2}$  to 2 inches long, on short pedicels; segments 5-7-nerved: style exserted, the capsule acute with its persistent base, sessile, a half-inch long: seeds thin,  $2\frac{1}{2}$  to 3 lines broad. — Proc. Am. Acad. 7. 390; Baker, Trim. Journ. Bot. 11. 359. Colorado Desert.

### 24. *HESPERALOE*, Engelm.

1. *H. YUCCÆFOLIA*, Engelm. Stem 2 to 4 feet high, sparingly branched: leaves a foot or two long, 3 or 4 lines broad, recurved, long-attenuate: bracts broad and acuminate, rather large: pedicels cymose-fascicled, 4 to 18 lines long: flowers a half to an inch long, with erect segments: stamens somewhat shorter; anthers small (a line long): style equalling the perianth, at length exserted, 2 or 3 or more times longer than the ovary: capsule ovate, acute, an inch long. — King's Rep. 5. 497. *Yucca* (?) *parviflora*, Torr. Bot. Mex. Bound. 221. *Aloe yuccæfolia*, Gray, Proc. Amer. Acad. 7. 390. W. Texas (from Frio County to mouth of the Pecos). A second species from the same region has been proposed (*H. Engelmanni*, Krauskopf), but is imperfectly known, perhaps to be distinguished by its more slender and flexuous branches and smaller bracts, its twice longer anthers, and the stouter included style scarcely longer than the ovary.

## 25. YUCCA, Linn.

\* Filaments obtuse, papillose; anthers cordate-sagittate: ovary narrowly oblong: stigmas more or less distinct, papillose. — § *EUYUCCA*, Engelm.

+ Fruit baccate, pendulous: seeds thick, rugose, not margined, with lobed or ruminated albumen. Mostly arborescent, with sessile panicle.

++ Leaves serrulate.

1. *Y. ALOIFOLIA*, Linn. Caudex 6 to 12 feet high, simple or sparingly branched: leaves thick, very rigid, tipped with a stout brown spine, 1 to 2 feet long or more, by an inch or two wide: panicle with rather small triangular bracts, smooth: flowers  $1\frac{1}{2}$  inches long; segments ovate: stigmas sessile, short and thick, straight: fruit 6-sided, 3 or 4 inches long, acutish: seeds 3 lines broad, half as thick. — Ker, Bot. Mag. t. 1700; Engelm. Trans. St. Louis Acad. 3. 34. *Y. Draconis*, Linn.; Lindl. Bot. Reg. t. 1894; with longer and softer leaves. *Y. conspicua*, Haw., branching from the base, with softer green-pointed leaves. Coast region, from North Carolina to Alabama. The varieties are only known in foreign gardens, under various names.

Dr. Engelmann describes two other species, — *Y. YUCATANA*, from Yucatan, 20 feet high, branching from the base: leaves slightly rough on the margin, a foot long or more: panicle densely villous, with lanceolate bracts: perianth-segments ovate-lanceolate: stamens much shorter than the ovary, — and *Y. GUATEMALENSIS*, Baker (Saund. Ref. Bot. t. 313), from Mexico and Guatemala, with scarcely pungent and slightly serrulate leaves  $2\frac{1}{2}$  or 3 feet long, flowers 3 inches long with lanceolate segments, and a short thick ovary with deeply 2-lobed spreading stigmas.

++ Margin of the leaf entire (often serrulate when young or sparingly filamentose when old).

2. *Y. GLORIOSA*, Linn. Caudex 4 to 6 feet high or less, simple or sparingly branched: leaves straight and rigid, pungent, often folded, 2 to  $2\frac{1}{2}$  feet long, roughish on the back: panicle pedunculate, smooth or pubescent, 2 to 4 feet long, with broad lanceolate bracts: flowers cream-white, often greenish or reddish; segments ovate, acute,  $1\frac{1}{2}$  inches long or more: stamens as long as the ovary: stigmas rather slender, at length divergent. — Ker, Bot. Mag. t. 1260; Engelm. l. c. 38. *Y. acuminata*, Sweet, Fl. Gard. t. 195. *Y. recurvifolia*, Salisb. Parad. t. 31. Sea-coast, North Carolina to Florida; in cultivation under numerous names and in several forms (Baker, Saund. Ref. Bot. t. 316–321; Carr. Rev. Hort. t. 89, 104).

3. *Y. CANALICULATA*, Hook. Caudex 6 to 25 feet high, branching at top: leaves very long ( $2\frac{1}{2}$  to  $4\frac{1}{2}$  feet by 2 or 3 inches wide), straight and very rigid, deeply channelled, rough on the back: panicle subsessile, ovate, 2 to 4 feet long, densely flowered, nearly glabrous, with large ovate or broadly lanceolate bracts: flowers cream-white; segments ovate or ovate-lanceolate, acute or acuminate,  $1\frac{1}{2}$  to  $2\frac{1}{4}$  inches long: filaments scarcely papillose, nearly equalling the pistil: style slender; stigmas narrow, deeply 2-lobed: fruit subcylindric, strongly beaked, 3 or 4 inches long: seeds 3 to  $3\frac{1}{2}$  lines broad. — Bot. Mag. t. 5201. *Y. Treculiana*, Carr. Rev. Hort. 7. 280 (name only); Engelm. l. c. 41. *Y. longifolia*, Engelm.; Buckley, Proc. Philad. Acad. 1862, 8. Texas to Northern Mexico.

++ ++ ++ Leaves coarsely filamentose on the margin.

4. *Y. BACCATA*, Torr. Caudex short or none: leaves very thick and rigid,  $1\frac{1}{2}$  to 3 feet long by an inch or two wide, channelled or concave, rough especially on the back, tipped by a very stout brown spine: panicle pedunculate, usually glabrous, with ovate-lanceolate or ovate bracts: perianth-segments narrow,  $2\frac{1}{2}$  to 3 inches long: stamens equalling the ovary: style more or less elongated, slender: fruit oval or cylindric, 3 to 5 inches long, dark purple, often long-beaked: seeds 4 to 8 lines broad, a line thick or more. — Bot. Mex. Bound. 221: Engelm. l. c. 44: Ill. Hort. 3 ser. t. 115. S. Colorado and W. Texas to S. California and Northern Mexico.

Var. *AUSTRALIS*, Engelm. l. c. Caudex taller (often 10 to 50 feet), branching: leaves thinner and smoother, with finer fibres: flowers smaller ( $1\frac{1}{2}$  inches long), with ovate segments and short style. — The more southern Mexican form.

5. *Y. SCHOTTII*, Engelm. l. c. 46. Caudex 2 to 5 feet high, branched from the base: leaves straight, rigid, about 9 inches long by 6 or 8 lines wide, concave, somewhat pungent, smooth, with very slender straight marginal threads: panicle loosely flowered, with flexuous peduncle and branches, and large lanceolate bracts: flowers rather small: style and stigmas short: fruit ovate, 2 inches long, shortly beaked. — S. Arizona.

+ + Fruit becoming dry and spongy, indehiscent, erect: seeds thickish, smooth and scarcely margined, with entire albumen. Tall and branching, with sessile panicles and serrulate leaves.

6. *Y. BREVIFOLIA*, Engelm. Caudex 15 to 30 feet high: leaves 3 to 8 inches long by as many lines wide, very rough and rigid, attenuate to a stout spine, nearly flat above: panicle pyramidal, with white

ovate to lanceolate bracts: flowers crowded, erect on very short pedicels, fetid, greenish white; segments narrowly lanceolate,  $1\frac{1}{2}$  to 2 inches long: stamens half the length of the ovary: stigmas short, sessile: fruit ovate, 2 or 3 inches long. — King's Rep. 5. 496, and l. c. 47. *Y. Draconis*, var. (?) *arborescens*, Torr. Pacif. R. Rep. 4. 147. Southeastern California to S. Utah.

+ + + Fruit capsular, septicidal and at length loculicidal at top, erect: seeds thin, smooth, broadly margined, with entire albumen. Caudex none or short, the panicle upon a tall scape.

+ + Leaves serrulate.

7. *Y. RUPICOLA*, Scheele. Acaulescent: leaves a foot or two long by an inch or two wide, rigid, erect and pungent, smooth, deep green, mostly oblique and undulate or twisted, with coarse reddish serratures: scape 4 to 7 feet high, with long and narrow bract-like leaves: panicle pyramidal, few-flowered; bracts small: flowers greenish white; segments ovate, sharply acuminate,  $1\frac{1}{2}$  to 3 inches long: stamens straight, equalling the ovary: style slender: capsule 6-sided, acute or beaked, 2 or  $2\frac{1}{2}$  inches long: seeds  $3\frac{1}{2}$  to 4 lines broad. — Linnæa, 23. 143; Engelm. l. c. 48. *Y. lutescens*, Carr. Western Texas.

Var. *RIGIDA*, Engelm. l. c. Leaves pale and glaucous, not twisted, carinate and often rough on the back, 8 to 12 inches long by 3 to 6 lines wide: capsule and seeds smaller. — Eastern New Mexico and Northern Mexico.

+ + + Margin of the leaves filamentose.

8. *Y. ANGUSTIFOLIA*, Pursh. Leaves straight, very stiff and pointed, usually 1 to 3 feet long by 3 to 6 lines wide, smooth: raceme usually simple, nearly sessile, 1 to 4 feet long: flowers greenish white or tinged with brown; segments broadly ovate, an inch or two long: stigmas green, shorter than the ovary: capsule 6-sided, 3 inches long, half as wide: seeds broadly margined, 5 or 6 lines broad. — Sims, Bot. Mag. t. 2236; Engelm. l. c. 50. Dakota to New Mexico.

Var. *ELATA*, Engelm. l. c. Caudex 3 to 5 feet high, with numerous glaucescent sometimes entire leaves  $\frac{1}{2}$  to  $1\frac{1}{2}$  feet long: panicle oblong or lanceolate, 3 or 4 feet long, as long as the peduncle: flowers white, with narrower segments. — *Y. constricta*, Buckl. Proc. Philad. Acad. 1862, 8? W. Texas to Utah and Northern Mexico. Various cultivated forms are probably referable to this (Baker, Gard. Chron. 1870, 1088).

Var. *MOLLIS*, Engelm. l. c. Acaulescent: leaves softer and less pungent, broadest (5 to 8 lines) in the middle: raceme or panicle  $\frac{1}{2}$  to

1 foot long, on a peduncle 2 or 3 feet high: flowers greenish: capsule shorter (2 inches long): seeds more narrowly margined. — *Y. stricta*, Sims, Bot. Mag. t. 2222. Arkansas to Louisiana and Texas.

9. *Y. FILAMENTOSA*, Linn. Caudex a foot high or less: leaves numerous, rather rigid, straight, with short point, rough on the back,  $1\frac{1}{2}$  to 2 feet long by 12 to 18 lines wide (sometimes oblanceolate or spatulate and obtuse, 2 or 3 inches wide, concave): panicle pyramidal, densely flowered, glabrous, on a stout scape 4 to 9 feet high; bracts of the scape short, oblique, spatulate: flowers greenish white, 1 to  $1\frac{1}{2}$  inches long: stamens equalling the pistil: stigmas pale, elongated, at length recurved: capsule cuspidate,  $1\frac{1}{2}$  inches long: seeds 3 lines broad. — Sims, Bot. Mag. t. 900; Baker, Saund. Ref. Bot. t. 324, 325; Engelm. l. c. 51. *Y. concava*, Haw. *Y. glaucescens*, Haw.; Sweet, Fl. Gard. t. 53. Near the coast, from Maryland to Florida and Louisiana.

Var. *FLACCIDA*, Engelm. l. c. Mostly stemless: leaves soft and flaccid, thin and flat, with a weak point and usually numerous very slender threads: panicle contracted, pubescent, as long as the scape: stigmas shorter, attenuate, connivent; capsule angled,  $2\frac{1}{2}$  inches long: seeds 4 or 5 lines broad. — *Y. flaccida*, Haw.; Lindl. Bot. Reg. t. 1895; Baker, l. c., t. 323. *Y. puberula*, Haw.; Sweet, Fl. Gard. t. 21; Baker, l. c., t. 322. *Y. glauca*, Sims, Bot. Mag. t. 2662; Baker, l. c., t. 315. *Y. exigua*, Baker, l. c., t. 314.

Var. (?) *BRACTEATA*, Engelm. l. c. Leaves rather rigid, roughish, with a slender sharp point: bracts of the scape larger and foliaceous, tapering upward: panicle contracted, half as long as the scape, rough or pubescent: stamens half as long as the pistil. — Coast of S. Carolina.

Var. (?) *LÆVIGATA*, Engelm. l. c. Leaves fewer, smooth, rigid and pungent, very long ( $2\frac{1}{2}$  to  $3\frac{1}{2}$  feet long by 10 to 15 lines wide), soon decumbent: scape 8 or 10 feet high, with lanceolate bracts, much longer than the pyramidal smoothish panicle: stigmas distinct to the base, deeply 2-lobed, erect. — S. Carolina to Florida.

\* \* Filaments acute, glabrous, erect: anthers broadly cordate, didymous: ovary obovate; stigma capitate-peltate, hairy-papillose: capsule loculicidal: seeds thin, smooth, with entire albumen. — § *HESPEROUCCA*, Engelm.

10. *Y. WHIPPLEI*, Torr. Caudex none or very short: leaves rigid, serrulate, smooth, carinate, nearly flat but concave toward the apex and attenuate to a stout brown spine, 10 to 20 inches long by 4 to 7 lines broad: scape 4 to 12 feet high, with imbricated sheathing bracts: panicle narrow and spike-like, dense, smooth: flowers greenish white,

subrotate; segments oblong-lanceolate, 1 or 2 inches long: style short, conical; stigma green, slightly 3-lobed: capsule globose-ovate, an inch or two long: seeds 3 or 4 lines broad. — Bot. Mex. Bound. 222; Engelm. l. c. 54. *Y. aloifolia*, Torrey, Pacif. R. Rep. 4. 147. San Francisco to San Diego and Arizona. *Y. graminifolia*, Wood (Proc. Acad. Philad. 1868, 167), appears to be a variety with longer and narrower leaves (20 inches long by 3 lines wide), laxer and more channelled, revolute toward the apex and tipped by a more slender spine.

## 26. LILIUM, Tourn.

\* Perianth-segments unguiculate.

+ Flowers erect, usually solitary; segments abruptly narrowed to the claw, coarsely spotted on the lower half: leaves linear-lanceolate: bulbs not rhizomatous. Atlantic States.

1. *L. PHILADELPHICUM*, Linn. Bulb small, of thick fleshy jointed scales: leaves whorled or scattered: perianth-segments reddish-orange, acute, spreading, 2 to 4 inches long. — Curtis, Bot. Mag. t. 519; Ker, Bot. Reg. t. 594; Baker, Journ. Linn. Soc. 14. 235; Babbage, Garden, 11. 135, fig. (bulb); Elwes, Monogr. Lil. t. 10. *L. andinum*, Nutt. Fras. Cat. *L. umbellatum*, Pursh. Canada to the Saskatchewan and south to N. Carolina and Colorado.

2. *L. CATESBÆI*, Walt. Bulb-scales thin, narrow and leaf-bearing: leaves scattered: perianth-segments scarlet with yellow base, long-acuminate, undulate, recurved above, 3 to 5 inches long, the claw very narrow. — Curtis, Bot. Mag. t. 259; Sweet, Fl. Gard. 2 ser. t. 185; Baker, l. c. 240; Babbage, l. c., fig. (bulb); Elwes, l. c., t. 28. *L. spectabile*, Salisb. Stirp. Rar. t. 5. N. Carolina to Florida, in pine-barrens.

+ + Flowers horizontal or ascending, usually several; segments narrowing gradually into the claw, spotless or finely dotted: leaves oblanceolate or linear-lanceolate: bulbs somewhat rhizomatous. Pacific Coast.

3. *L. WASHINGTONIANUM*, Kellogg. Bulbs large; scales not jointed: leaves oblanceolate, more or less verticillate: flowers horizontal, white becoming purplish, very fragrant; segments 3 or 4 inches long, not recurved: anthers 5 or 6 lines long: capsule obovate, truncate. — Proc. Calif. Acad. 2. 13; Wood, Proc. Philad. Acad. 1868, 166; Baker, Gard. Chron. 1871, 709, f. 142, and l. c. 232; Regel, Gartenfl. t. 710; Fl. Serres, t. 1795; Babbage, l. c., fig. (bulb). Oregon and southward in the Sierra Nevada; Cuyumaca Mountains.



4. *L. RUBESCENS*. Similar, but bulbs small (2 inches in diameter): flowers erect or ascending, with revolute segments, usually  $1\frac{1}{2}$  or 2 inches long, sometimes more, pale lilac or nearly white, becoming rose-purple: anthers 2 or 3 lines long. — *L. Washingtonianum*, var. *purpureum*, Masters, Gard. Chron. 2. 2. 322, f. 67; Baker, l. c. 233. California (Coast Range, Marin to Humboldt Counties).

5. *L. PARRYI*, Watson. Bulb small, with jointed scales: leaves linear-oblongate, usually scattered: flowers horizontal, pale yellow; segments about 3 inches long, with spreading or recurved tips: capsule narrowly oblong. — Proc. Davenport Acad. 2. 188, t. 5, 6. California (San Geronio Pass, San Bernardino County).

\* \* Segments oblanceolate, yellow or orange, coarsely spotted with brown.

Flowers erect or horizontal, small.

↔ Species of Atlantic States. [See page 301.]

6. *L. GRAYI*. Leaves lanceolate, 2 inches long or less, in whorls of 4 to 8, not acuminate: flowers  $1\frac{1}{2}$  to  $2\frac{1}{2}$  inches long, horizontal, often solitary; segments spreading but not recurved, apparently deep reddish-orange, covered throughout with purplish spots. — Summit of Roan Mountain (Gray, 1840) and Peaks of Otter (A. H. Curtiss, July, 1871). The specimens are scanty, but appear very distinct.

↔ ↔ Californian species.

7. *L. PARVUM*, Kellogg. Bulb rhizomatous, of small narrow jointed scales: leaves mostly verticillate, acute or acuminate: flowers few to very many, suberect, 1 to  $1\frac{1}{2}$  inches long, yellow or orange, rather finely dotted except on the reddish spreading or recurved tips: anthers a line or two long: capsule subglobose, truncate, 6 to 9 lines long. — Proc. Calif. Acad. 2. 179, f. 12; Regel, Gartenfl. 1872, t. 725; Elwes, Monogr. t. 24. *L. Canadense*, var. *Walkeri*, Wood, l. c. 166, and var. *parvum*, Baker; Hook. f. Bot. Mag. t. 6146; Babbage, l. c. 156, fig. (bulb). In the Sierra Nevada to Oregon.

8. *L. MARITIMUM*, Kellogg. Bulb small, conical: stem rather low: leaves usually scattered, narrow, often obtuse: flowers solitary or few, horizontal,  $1\frac{1}{4}$  to 2 inches long, deep reddish-orange, spotted below; segments recurved above: style and stamens short; anthers 2 lines long: capsule "long and narrow." — Proc. Calif. Acad. 6, 140. *L. Canadense*, var. *parviflorum*, Bolander, same, 5. 206. Swamps, Marin to Humboldt Counties.

+ + Flowers nodding, large.

↔ Species of the Atlantic States.

9. *L. CANADENSE*, Linn. Tall, rhizomatous: leaves usually verticillate, lanceolate to linear-lanceolate, acuminate, scabrous on the

veins beneath: flowers yellow, spotted below, the segments spreading and somewhat recurved above: capsule oblong-obovate. — Ker, Bot. Mag. t. 800, 858; Fl. Serres, t. 1174; Baker, Journ. Linn. Soc. 14. 240, excl. vars.; Babbage, l. c. 156, fig. (bulb). *L. penduliflorum*, DC.; Red. Lil. t. 105. *L. pardalinum*, var. *Bourgæi*, Baker, l. c. 242. Canada (N. Brunswick to Rainy River) to Georgia.

10. *L. SUPERBUM*, Linn. Like the last, but the perianth-segments spreading from the base and strongly revolute: leaves often scattered, smooth: capsule somewhat broader. — Ker, Bot. Mag. t. 936; Fl. Serres, t. 1014; Baker, l. c. 242, excl. vars.; Elwes, l. c., t. 21. Canada (N. Brunswick to W. Ontario) and southward.

Var. *CAROLINIANUM*, Chapm. Low: flowers few (1 to 3). — Baker, l. c. *L. Carolinianum*, Michx.; Ker, Bot. Reg. t. 580; Sims, Bot. Mag. t. 2280; Elwes, l. c., t. 28. *L. Michauxii*, Poir. Suppl. 3. 457. *L. autumnale*, Lodd. Bot. Cab. t. 335.

++ ++ Pacific Coast: flowers few to many, with revolute segments.

11. *L. COLUMBIANUM*, Hanson. Bulb small, not rhizomatous, the scales not jointed: leaves usually in whorls of 5 to 9 or more, 2 to 4 inches long, flat and smooth: flowers bright reddish-orange, with strongly revolute segments,  $1\frac{1}{2}$  to 2 inches long: stamens short; anthers 2 or 3 lines long: capsule oblong, an inch long, acutely 6-angled. — Baker, l. c. 243; Babbage, l. c., fig. (bulb); Elwes, Monog. t. 32. *L. Canadense*, var. *parviflorum*, Hook. Fl. Bor.-Am. 2. 181, and var. *minus*, Wood, l. c. 166. *L. lucidum*, Kellogg, Proc. Calif. Acad. 6. 144. *L. Humboldtii*, var., Babbage, l. c. From British Columbia to Northern California in the Sierra Nevada.

12. *L. HUMBOLDTII*, Roehl & Leicht. Bulb as in the last, but large: leaves in whorls of 10 to 20, undulate, somewhat scabrous: flowers reddish-orange, 3 or 4 inches long; segments strongly revolute, the outer abruptly narrowed to a short broad claw: anthers 4 to 8 lines long: capsule large, obovoid, acutely 6-angled. — Regel, Gartenfl. 1872, t. 724; Fl. Serres, t. 1973; Baker, l. c. 244; Elwes, l. c., t. 31. *L. Canadense*, var. *puberulum*, Torr. Pacif. R. Rep. 4. 146, and var. *Humboldtii*, Baker, Gard. Chron. 1871, 1165. *L. Bloomerianum*, Kellogg, Proc. Calif. Acad. 4. 160, and 5. 88, f. 4 (var. *ocellatum*). In the dry higher foothills of the Sierra Nevada (Butte County and southward) and Coast Ranges from Santa Barbara to San Diego.

13. *L. PARDALINUM*, Kellogg. Rhizome thick and branching; scales jointed below: leaves flat, smooth, narrowly lanceolate to linear, the middle in whorls of 9 to 15: flowers bright orange-red,

lighter yellow in the centre, 2 or 3 inches long; segments strongly revolute: anthers 4 or 5 lines long: capsule narrowly oblong,  $1\frac{1}{2}$  inches long or more. — Proc. Calif. Acad. 2. 12; Baker, l. c. 242; Elwes, l. c., t. 26. *L. Californicum*, Lindl.; Florist, 1873, t. 33. *L. superbum*, var. *pardalinum*, Baker, Journ. Hort. Soc. 1873, 45. *L. Canadense*, var. *pardalinum* and var. *Californicum*, Bolander, Proc. Calif. Acad. 5. 206. Coast Ranges and foothills of the Sierra Nevada (in wet places) from Central California northward.

Var. *ANGUSTIFOLIA*, Kellogg. The form with narrow scattered leaves. — *L. Roezli*, Regel, Gartenfl. 1870, t. 667; Baker, Journ. Linn. Soc. 14. 243. *L. Canadense*, var. *Hartwegi*, Baker, Gard. Chron. 1871, 1165.

## 27. FRITILLARIA, Linn.

\* Styles distinct to the middle; stigmas linear.

+ Capsule rather obtusely angled: flowers mostly large (an inch long): bulb-scales 3 or 4 lines long. — § *LILIORHIZA*, Baker.

1. *F. RECURVA*, Benth. Bulb-scales numerous and thick: leaves linear-lanceolate, mostly in two whorls near the middle of the stem: flowers 1 to 7, tinged or blotched with light purple or scarlet, 12 to 18 lines long; segments narrowly oblanceolate with recurved tips: stamens a little shorter, equalling the very slender style. — Pl. Hartw. 340; Baker, Journ. Linn. Soc. 14. 272, and Bot. Mag. t. 6264 (poor). Sierra Nevada (Placer County to Oregon).

2. *F. LILIACEA*, Lindl. Bulb-scales few, very thick: leaves oblanceolate to linear, approximate or whorled near the base: flowers 1 to 5, greenish white (not blotched), 8 to 12 lines long; segments oblanceolate, spreading: anthers shorter (1 to  $1\frac{1}{2}$  lines): style stout. — Baker, l. c. 273. *F. alba*, Kellogg, Proc. Calif. Acad. 1. 46. *Liliorhiza lanceolata*, Kellogg, l. c. 2. 46, f. 1; Regel, Gartenfl. 1872, t. 715. Lower Sacramento Valley; stamens much shorter than the styles, as in all the following species.

3. *F. BIFLORA*, Lindl. Usually low: bulb-scales few, ovoid, often tipped with a small scarious blade: leaves narrowly lanceolate to oblong-lanceolate, few, scattered or somewhat whorled near the base: flowers 1 to 3, dark brownish or greenish purple; segments oblanceolate, widely spreading: style stout: capsule broadly obovoid. — Baker, l. c. *F. Kamschatcensis*, auth. *F. lanceolata*, Torr. Bot. Mex. Bound. t. 61. *F. Grayana*, Reich. f. & Baker, Trim. Journ. Bot. 1878, 262. Coast Ranges, from Mendocino County to San Diego.

4. *F. KAMSCHATCENSIS*, Ker. Resembling the last, but usually taller, with more numerous leaves on the upper portion of the stem: capsule broadly oblong-ovate. — Hook. Fl. Bor.-Am. 2. 181, t. 193, A; Baker, l. c. 273. *Lilium*, Linn. *L. quadrifoliatum*, E. Meyer, Rel. Hænk. 2. 126. *L. affine*, Schult. Syst. 7. 40, in part. Alaska and E. Siberia.

+ + Capsule acutely angled or winged: bulb-scales thick, about half an inch long. — § GONIOCARPA, Baker.

++ Flowers usually large: leaves lanceolate to linear-lanceolate.

5. *F. LANCEOLATA*, Pursh. Leaves in 1 to 3 whorls above the middle of the stem: flowers 1 or 2, brownish purple mottled with greenish yellow; segments narrowly oblanceolate: stamens 6 or 8 lines long. — Hook. l. c., t. 193, B; Baker, l. c. 271. British Columbia to Mendocino County; the following varieties in Central California (Coast Ranges and foothills of the Sierra Nevada).

Var. *FLORIBUNDA*, Benth. Flowers 4 to 8 or rarely fewer, lighter colored (greenish yellow blotched with purple); segments 4 to 6 lines broad, strongly arched with broad nectaries, acute: lower pedicels an inch long or more. — Pl. Hartw. 338. *F. mutica*, Lindl. *F. viridia*, Kellogg, Proc. Calif. Acad. 2. 9. *Liliorhiza viridia*, Kellogg, l. c. 2. 48.

Var. *GRACILIS*. Flowers smaller than the last, with narrow and more acuminate segments: stamens short and anthers often small. — *F. lanceolata*, var. (?), Benth, l. c. 340 (n. 2005, Hartw.; n. 350, Bridges; n. 3969, Bolander).

++ ++ Flowers smaller: leaves linear.

6. *F. PARVIFLORA*, Torr. Leaves mostly whorled: flowers 3 to 20, on short strongly recurved pedicels, yellowish tinged with purple; segments less arched, with shallow nectaries. — Pacif. R. Rep. 4. 146; Baker, l. c. 272. *F. multiflora*, Kellogg, l. c. 1. 57? Sierra Nevada (Calaveras County).

7. *F. ATROPURPUREA*, Nutt. Usually low and more slender: leaves scattered or somewhat whorled: flowers 1 to 6, dull purple with more or less of yellowish green, on slender pedicels. — Journ. Acad. Philad. 7. 54; Baker, l. c. Sierra Nevada (Placer County to the Columbia) and east to Utah and Wyoming.

\* \* Styles connate to the summit; stigma 3-lobed: capsule obtusely angled: flowers not mottled, with obscure nectaries: leaves narrow or linear, scattered or somewhat whorled. — § AMBLIRION, Baker.

8. *F. PLURIFLORA*, Torr. Bulb-scales a half to one inch long: stem usually tall, 4-12-flowered: leaves 8 to 15: flowers reddish

purple, 9 to 12 lines long, on long pedicels. — Benth. Pl. Hartw. 338; Baker, l. c. 270. Sierra Nevada (Butte and Placer Counties).

9. *F. PUDICA*, Spreng. Bulb-scales very small and rounded: stem low, usually 1–3-flowered: leaves 3 to 8: flowers yellow or orange, tinged outside with purple, 5 to 9 lines long. — Baker, l. c. 267. *Lilium* (?) *pudicum*, Pursh, Fl. 228, t. 8. *Amblirion pudicum*, Raf.; Torr. Stansb. Rep. 396, t. 9. *Theresia pudica*, Klatt, Hamb. Gart. 16. 439. Northern Sierra Nevada to British Columbia, and east to Utah and Montana.

## 28. ERYTHRONIUM, Linn.

\* Flowers solitary: capsule obovate: often propagating by offshoots or runners.

1. *E. AMERICANUM*, Smith. Offshoots arising from the base of the bulb: leaves oblong-lanceolate, mottled and dotted: flower light yellow, often dotted at base, 10 to 20 lines long: style club-shaped and stigmas coherent: capsule 6 lines long. — Ker, Bot. Mag. t. 1113; Bigel. Med. Bot. 3. 151, t. 58; Baker, Journ. Linn. Soc. 14. 298. *E. dens-canis*, var., Linn. *E. Carolinianum*, Walt. *E. lanceolatum*, Pursh. *E. angustatum* and *flavum*, Raf. *E. bracteatum*, Boott. *E. Nuttallianum*, Schult.; Regel, Gartenfl. 1871, t. 695. Canada (New Brunswick to W. Ontario) to Florida and Arkansas.

2. *E. ALBIDUM*, Nutt. Like the last, but leaves usually narrower and not mottled nor dotted: flowers bluish-white; segments not toothed at base: style more slender, the stigmas somewhat spreading. — Gen. 1. 223; Baker, l. c. 298. New York and Pennsylvania to Minnesota and Texas.

3. *E. PROPULLANS*, Gray. Offshoot arising from the stem near the middle: leaves smaller and more acuminate: flowers bright rose-color, yellowish at base, 6 lines long: style slender; stigmas coherent. — Amer. Naturalist, 5. 298, f. 74; Baker, l. c. 299. Minnesota.

\*\* Flowers one to several: capsule oblong: new corms sessile at the base of the old.

4. *E. GRANDIFLORUM*, Pursh. Corm often 2 inches long, narrow: leaves not mottled, opposite: flowers solitary or racemose (1 to 6), yellow or cream-colored with a more or less orange base, 1 or 2 inches long: filaments slender: stigmas at length spreading: ovary and capsule (an inch long or more) narrowly oblong. — Lindl. Bot. Reg. t. 1786; Regel, Gartenfl. 1876, t. 874, f. 6; Baker, l. c. 297. Oregon and Washington Territory. The following varieties need farther investigation.

Var. (?) *ALBIFLORUM*, Hook. Flowers large, white with yellow and orange base: leaves mottled. — Fl. Bor.-Am. 2. 182; Regel, Gartenfl. 1874, t. 767, f. 1-4. *E. giganteum*, Lindl. l. c. ?; Hook. Bot. Mag. t. 5714. *E. grandiflorum*, Van Houtte, Fl. Serres, t. 2117. Washington Territory.

Var. (?) *MINOR*, Morren. Flowers small (an inch long), bright yellow. — Belg. Hort. 26. 109, t. 6. Utah and Colorado.

Var. (?) *SMITHII*, Hook. Flowers large, tinged with purple or rose-color: filaments often dilated: ovary broader and more obtuse. — Fl. Bor.-Am. 2. 182. *E. revolutum*, Smith, Rees' Cyc. Vancouver Island; Mendocino County, California (n. 4709, Bolander).

5. *E. HARTWEGI*. Bulb small: leaves usually more or less separated, apparently mottled, often rather small: flowers solitary, or 2 or 3 in a sessile umbel, light yellow and orange, 1 or 2 inches long, the segments spreading or scarcely recurved: filaments usually short, slender; anthers 2 to 4 lines long: ovary ovate-oblong. — *E. grandiflorum*, Benth. Pl. Hartw. 339. Sierra Nevada (Placer to Plumas Counties).

6. *E. PURPURASCENS*, Watson. Bulb an inch or two long: leaves undulate, often large: flowers usually 4 to 8 in a pedunculate sub-umbellate raceme, light yellow tinged with purple, deep orange at base, 9 to 12 lines long: pedicels very unequal: anthers a line or two long: style clavate: capsule narrow, about an inch long. — Proc. Amer. Acad. 12. 277. *E. grandiflorum*, var. *multiflorum*, Torr. Pacif. R. Rep. 4. 146, and var. *multiscapidea*, Wood, Proc. Philad. Acad. 1868, 166. *Fritillaria multiscapidea*, Kellogg, Proc. Calif. Acad. 1. 46. *E. revolutum*, Baker, Gard. Chron. 1876, 138, seems to be only a very slender 1-flowered form of this species. Sierra Nevada (Placer to Plumas Counties).

## 29. LLOYDIA, Salisb.

1. *L. SEROTINA*, Reichenb. Stem 2 to 6 inches high, equalling the leaves: flowers erect, usually solitary; perianth-segments oblanceolate, obtuse, obscurely pitted at base, 4 or 5 lines long, exceeding the stamens and style: capsule obovate, obtusely angled, 4 lines long: seeds chestnut-colored. — *Ornithogalum bracteatum*, Torrey, Ann. Lyc. N. Y. 2. 251. *Cronyxium serotinum* and *Fenelonina bracteata*, Raf. Alpine and arctic regions of the northern hemisphere; Alaska and Arctic Coast, Rocky Mountains of Colorado to 38° lat., and on the Clover Mountains, Nevada.

## 30. CALOCHORTUS, Pursh.

- \* Inner perianth-segments (*petals*) strongly arched and broadly pitted, the gland usually with a transverse scale or fringe; outer segments (*sepals*) naked, rarely spotted: capsule more or less broadly elliptical, obtuse or acute, deeply triquetrous with thin acute or winged lobes, septicidal: seeds mostly brownish with close pitted testa: flowers or fruit more or less nodding, and stem usually lax. — § EUCALYCHORTUS.

+ Flowers subglobose, nodding: stem usually tall and branching.

1. *C. ALBUS*, Dougl. Stem 1 to 3 feet high: flowers white with purplish base: petals acutish, an inch long, bearded and ciliate: gland lunate, with four transverse imbricate fringed scales: capsule short-beaked, an inch or two long, half as wide. — Maund, Bot. t. 98; Baker, Journ. Linn. Soc. 14. 304. *Cyclobothra alba*, Benth. Trans. Hort. Soc. 1. 413, t. 14, f. 3; Lindl. Bot. Reg. t. 1661; Fl. Serres, t. 1171. *C. paniculata*, Lindl. California (Los Angeles to Sonoma County and foothills of the Sierra Nevada).

2. *C. PULCHELLUS*, Dougl. Stem usually a foot high or more: flowers yellow or orange: petals ciliate and bearded with glandular-tipped hairs, deeply pitted, the gland covered by the reflexed stiff hairs of its upper margin: anthers obtuse: capsule obtuse, an inch long or more. — Baker, l. c. 303. *Cyclobothra pulchella*, Benth. l. c., t. 14, f. 1; Lindl. l. c., t. 1662; Regel, Gartenfl. t. 802. California (Monterey to Mendocino County).

+ + Flowers campanulate, erect when open; pedicels becoming recurved: stem mostly low and flowers often subumbellate.

+ + Flowers yellow.

3. *C. BENTHAMII*, Baker, l. c. 304. Resembling the last: stem low and leaves narrow: flowers nearly erect: petals a half-inch long, mostly obtuse, often deep brown at base, with shallower pit: anthers acute: capsule 6 to 9 lines long. — *Cyclobothra elegans*, var. *lutea*, Benth. Pl. Hartw. 338. California (in the Sierra Nevada, Mariposa to Butte Counties).

+ + Flowers white or light lilac.

= Petals covered with hairs and mostly ciliate.

4. *C. MAWEANUS*, Leichtlin. Low, usually branched; bracts an inch long or more: petals white, purplish at the broad base, 6 to 8 lines long, somewhat pitted, the gland covered by a broad transverse semicircular scale: anthers lanceolate, acuminate: capsule oblong-elliptic, acutish. — *C. elegans* of California, mainly; Hook. f. Bot. Mag. t. 5976; Baker, l. c. 305. California (Coast Ranges, from San Francisco to Humboldt County, and near Chico).

5. *C. CÆRULEUS*. Low, umbellately 2-5-flowered; pedicels very slender: bracts smaller: petals 6 or 7 lines long, lilac dotted and lined with blue, with narrower claw, and the gland covered by an appressed fringed scale: anthers oblong, obtuse: capsule orbicular or nearly so, obtuse, 6 lines long. — *Cyclobothra elegans*, var., Benth. Pl. Hartw. 338. *C. cærulea*, Kellogg, Proc. Calif. Acad. 2. 4. *C. glaucus*, Regel, Act. Hort. Petrop. 3. 285? California (in the Sierra Nevada, Placer to Plumas Counties; Hartweg, n. 1988; etc.).

6. *C. ELEGANS*, Pursh. Similar in habit: petals greenish white, purplish at base, bearded but not ciliate or only sparingly so, the lunate gland covered by a very narrow and deeply fringed scale: anthers long-acuminate: capsule as in the last. — Dougl. Hort. Trans. 7. 278, t. 9, f. B. *Cyclobothra*, Lindl. Oregon and Idaho.

Var. *NANUS*, Wood. Subalpine, dwarf and very slender: petals narrow and often acute or acuminate, more hairy and ciliate. — Proc. Philad. Acad. 1868, 168. *C. Lyallii*, Baker, l. c. 305. Siskiyou Mountains, California; Mount Hood, Oregon, and northward to British Columbia.

7. *C. TOLMIEI*, Hook. & Arn. Stouter and taller (a foot high), usually branched: petals 9 to 15 lines long, tinged or marked with lilac, covered and fringed with purple and white hairs; gland without scale, bordered above by a dense fringe of reflexed hairs: anthers lanceolate, acuminate, 2 or 3 lines long: capsule broadly elliptic, acutish at each end, 10 to 15 lines long. — Bot. Beechey, 398. *C. elegans*, var., Baker, l. c. 305. Oregon to base of Mount Shasta.

8. *C. APICULATUS*, Baker, l. c. 305. A similar species, but still taller and stouter, with an umbel of larger straw-colored flowers. — Northern Idaho.

= = Petals hairy only toward the base or wholly naked.

9. *C. NUDUS*. Low: leaf solitary, 3 to 10 lines broad: bracts small (rarely an inch long): flowers 1 to 6, in a single umbel: petals 4 to 10 lines long, white or pale lilac, without hairs, denticulate; gland with a broad transverse appressed scale: anthers linear-oblong (2 or 3 lines long), obtuse: capsule oblong, acute at each end, 8 or 10 lines long: seeds yellowish, papillose, with a white vesicle at base. — *C. elegans*, var. *subcalvatus*, Baker, l. c. 305. California (in the Sierra Nevada, Yosemite Valley to Plumas County; n. 1986, Hartweg).

10. *C. LILACINUS*, Kellogg. Stem bulbiferous near the base, with broad leaves and long conspicuous bracts: flowers 4 to 10, on long pedicels in 1 to 3 umbels, or subumbellate: petals pale lilac with



purplish claw, 6 to 12 lines long, somewhat hairy below the middle; gland ciliate-margined and with a narrow scale: anthers oblong (1 to  $1\frac{1}{2}$  lines long), obtuse: capsule elliptical, obtuse at each end, an inch long. — Proc. Calif. Acad. 2. 5; Baker, l. c. 306. *C. umbellatus*, Wood, l. c. 168. *C. uniflorus*, Hook. f. Bot. Mag. t. 5804. California (Coast Ranges, San Francisco to the Geysers).

11. *C. UNIFLORUS*, Hook. & Arn. Stem very short, bulbiferous, 1–2-flowered: bracts elongated: petals lilac with purplish claw, the lower half hairy above the small purple densely hairy gland: anthers obtuse, 2 lines long: capsule unknown. — Bot. Beechey, 398, t. 94; Baker, l. c. 306. *Cyclobothra*, Kunth. California (Coast Ranges, Monterey to Sonoma County).

\* \* Flowers open-campanulate, with usually densely hairy glands (without scales, except in n. 12); sepals often hairy or subglandular within: capsule (except in n. 12, 13) narrowly oblong and thick-lobed, acute, septicidal: seed-testa white, loose and spongy, minutely tessellated: pedicels stout, erect, and stems usually stouter and more strict. — § *MARIPOSA*, Wood.

+ Capsule as in § *Eucalychortus*: flowers large, lilac.

12. *C. GREENEI*. Stem stout, branching, 2–5-flowered, a foot high or more: leaf an inch broad: bracts elongated: sepals with a yellowish hairy spot; petals lilac, barred below with yellow and more or less of purple, and loosely covered with long hairs, rarely at all ciliate: gland deep, densely villous with long hairs above a broad transverse lacinate scale: anthers broad, acute or obtuse, 3 to 6 lines long: capsule an inch long, narrowed to a stout beak. — Siskiyou County, California (Rev. E. L. Greene); Multnomah County, Oregon (T. J. Howell).

13. *C. NITIDUS*, Dougl. Stem umbellately 1–3-flowered, shortly bracteate in the middle: leaf narrow: sepals naked; petals cream-colored with a lilac spot in the centre, sparingly hairy below; gland shallow, narrowly oval, densely covered with tangled yellow hairs, without scale: anthers acute,  $2\frac{1}{2}$  to 4 lines long: capsule round to broadly elliptical, 9 lines long, with short stout beak. — Hort. Trans. 7. 277, t. 9, f. A; Baker, l. c. 307. *Cyclobothra*, Kunth. *C. eurycarpus*, Watson, King's Rep. 5. 348. Oregon to N. E. Nevada.

+ + Capsule narrowly oblong, with thick obtusely angled lobes.

++ Flowers yellow or orange, more or less marked with brown or purple.

14. *C. WEEDII*, Wood. Corm fibrous-coated: stem leafy, 1–3-flowered: leaves convolute: sepals with a slightly hairy brown spot; petals deep yellow, dotted and often margined with purple, covered with slender hairs and ciliate, an inch long or more; gland small,

densely hairy: anthers acute, 4 to 6 lines long. — Proc. Philad. Acad. 1868, 169. *C. luteus*, var. *Weedii*, Baker, l. c. 309. *C. citrinus*, Baker, Bot. Mag. t. 6200. California (Coast Ranges, San Diego County and northward).

Var. *PURPURASCENS*. Petals purple or blotched with purple; gland somewhat larger. — Santa Barbara and Cajon Pass.

15. *C. KENNEDYI*, Porter. Stem 2-4-flowered, usually stout: sepals broad, with a purple spot; petals reddish-orange, not ciliate nor hairy, or only slightly so upon a broad deep-purple spot surrounding the densely hairy gland: anthers 4 lines long, on very short filaments. — Coulter's Bot. Gazette, 2. 79. Southern California (Fort Tejon to Providence Mountains).

16. *C. LUTEUS*, Dougl. Stem bulbiferous near the base, 1-6-flowered: leaves usually very narrow: sepals narrowly lanceolate, with a brown spot; petals an inch or two long, yellow to deep orange, lined with brownish purple especially on the middle third where it is usually slightly hairy; claw purplish; gland round or somewhat lunate, densely covered with ascending hairs: anthers yellow, obtuse,  $2\frac{1}{2}$  to 5 lines long: capsule 1 to  $1\frac{1}{2}$  inches long. — Lindl. Bot. Reg. t. 1567; Fl. Serres, t. 104, f. 2; Baker, l. c. 309. California (San Diego to Mendocino County and foothills of the Sierra Nevada). Frequent and very variable in color and markings, perhaps running into *C. venustus*.

Var. *CITRINUS*. The whole petal deep or lemon yellow, with a central circular or transverse brown spot. — *C. venustus*, var. *citrinus*, Baker, l. c.

Var. *OCULATUS*. Petals white, lilac or yellowish, with a similar dark central spot; gland usually narrowly lunate.

17. *C. CLAVATUS*. Distinct from the rest of the group in the strongly clavate hairs which cover the lower half of the petal: petals yellow tinged or lined with brown; gland deep, circular: anthers purple, obtuse, 4 or 5 lines long. — California (San Luis Obispo; J. G. Lemmon, 1878).

18. *C. AUREUS*, Watson. Very low: petals without hairs, yellow with a narrow crescent of purple bordering the rounded gland, which is densely covered with reflexed hairs. — Amer. Naturalist, 7. 303; Baker, l. c. 305. S. Utah.

++ ++ Flowers white or lilac.

19. *C. VENUSTUS*, Benth. Resembling *C. luteus*: petals white or pale lilac, with a more or less conspicuous reddish spot at top, a brownish yellow-bordered centre, and a brownish base; gland large, oblong,

usually densely hairy and surrounded by scattered hairs : capsule 1 to  $2\frac{1}{2}$  inches long. — Hort. Trans. 1. 412, t. 15, f. 3 ; Lindl. Bot. Reg. t. 1669 ; Fl. Serres, t. 104, f. 3 ; Regel, Gartenfl. t. 865 ; Baker, l. c. 310. California (from Alameda County southward) ; frequent and very variable.

Var. *PURPURASCENS*. Petals deep lilac or purplish, with similar markings.

20. *C. SPLENDENS*, Dougl. Like the last, but the petals clear lilac, paler below (the claw somewhat darker), with scattered white hairs below the middle, and with or without a round densely hairy gland : anthers purple, obtuse or acute, 3 to 6 lines long. — Benth. l. c., t. 15, f. 1 ; Lindl. Bot. Reg. t. 1676 ; Baker, l. c. 309. California (Monterey to San Diego).

21. *C. FLEXUOSUS*, Watson, l. c. Stem stout, more or less flexuous, branching, not bulbiferous : sepals shorter, obtusish ; petals as in the last, usually slightly hairy or dotted around the brown or orange gland : anthers obtuse,  $1\frac{1}{2}$  to 3 lines long : capsule oblong, an inch long. — Baker, l. c. 306. S. Utah.

22. *C. PALMERI*. Stem very slender, lax and flexuous, a foot or two high, 1-7-flowered, bulbiferous near the base : sepals with narrowly acuminate recurved tips, spotted ; petals 6 to 12 lines long, white (or yellowish below) with a brownish claw, and with scattered hairs around the ill-defined broad densely hairy gland : anthers obtuse, 3 lines long : capsule very narrow, an inch long or more. — California (near the Mohave River ; n. 527, Palmer, 1876).

23. *C. MACROCARPUS*, Dougl. Stem erect and rigid, with 3 to 5 narrow short cauline leaves, 1- (rarely 2-) flowered : sepals acuminate, with sometimes a hairy spot ; petals acute,  $1\frac{1}{2}$  to 2 inches long, purple-lilac, paler at base, with a greenish midvein, and somewhat villous above the oblong densely hairy gland : anthers acutish, 4 to 6 lines long. — Hort. Trans. 7. 275, t. 8 ; Lindl. Bot. Reg. t. 1152 ; Baker, l. c. 309. Washington Territory and Idaho to N. California. Peculiar in its habit.

24. *C. NUTTALLII*, Torr. & Gray. Stem slender, bulbiferous at base, with a single narrow cauline leaf (rarely 2 or 3), umbellately 1-5-flowered : sepals ovate-lanceolate, often with a dark or hairy spot ; petals an inch or two long, white tinged with greenish yellow or lilac, with a purplish spot or band above the yellow base, and hairy around the circular or oblong gland : anthers obtuse, sagittate, 3 or 4 lines long. — Pacif. R. Rep. 2. 124 ; Baker, l. c. 306, excl. syn. *Fritillaria alba*, Nutt. Gen. 1. 222 ; Baker, l. c. 271. *Amblyrium album*, Sweet,

*C. luteus*, Nutt. Journ. Acad. Philad. 7. 53. *C. Leichtlinii*, Hook. f. Bot. Mag. t. 5862; Baker, l. c. 310. California (Sierra Nevada, often dwarf and alpine) to Dakota, Colorado and New Mexico. A variable species, and of the widest range.

25. *C. GUNNISONI*, Watson. Resembling the last, but with acuminate anthers and a broad transverse gland: petals light lilac, yellowish-green below the middle, banded and lined with purple.—King's Rep. 5. 348; Baker, l. c. 310. Rocky Mountains, from Wyoming to New Mexico.

\* \* \* Flowers open-campanulate, the glands naked or less densely hairy; sepals more or less pitted: capsule linear, acute, septicidal: upper leaves usually bulbiferous in the axils. Mexican.—§ *CYCLOBOTHRA*, Baker. (*Cyclobothra*, Sweet.)

+ Stem 1-2-flowered, leafy: leaves dilated at base: flowers and fruit nodding: petals oblong-lanceolate.

26. *C. HARTWEGI*, Benth. Stem stout, a foot high or less: leaves narrow, elongated: sepals nearly equalling the petals, purplish with a darker spot at base; petals purplish with darker veins, and with long hairs on the margin and midvein, 18 lines long by 6 wide; gland dark, naked: anthers obtuse, 3 or 4 lines long, on elongated filaments: capsule with thin acutely angled lobes,  $1\frac{1}{2}$  inches long.—Pl. Hartw. 26; Baker, l. c. 307. *Cyclobothra*, Kunth. Aguas Calientes (n. 230, Hartweg).

27. *C. BONPLANDIANUS*, Schult. f. Similar, but the cauline leaves short and acuminate-lanceolate: sepals shorter than the petals, yellowish with a purple pit; petals purple, tinged with yellow, somewhat hairy and ciliate with short stiff hairs, 14 to 16 lines long; gland dark, naked.—Syst. Veg. 7. 1532. *Cyclobothra purpurea*, Sweet, Fl. Gard. 2 ser. t. 20. *C. purpureus*, Baker, l. c. 308, with syn., in part. Michoacan to Oaxaca.

28. *C. FUSCUS*, Schult. f. Corm fibrous-coated: flower smaller, erect or somewhat nodding: sepals slightly hairy within; petals 5 or 6 lines long by  $2\frac{1}{2}$  broad, naked excepting a dense cluster of yellow hairs on each side of the gland.—Syst. 7. 1534. “*Aris-mendi*” (Karwinsky). Probably a good species, judging from the description.

29. *C. SPATULATUS*. Resembling *C. Bonplandianus*: flowers purple; sepals and petals spatulate, with a dark hairy roundish gland at the summit of the narrow naked claw; petals 9 or 10 lines long, ciliate and covered with long scattered hairs.—Oaxaca (Ghiesbreght).

+ + Stem usually branching, often tall: leaves narrowly linear, narrow at base: flowers small, nodding or erect, the pedicels erect in fruit: petals oblong-obovate, cuneate or rhombic.

30. *C. FLAVUS*, Schult. f. Corm fibrous-coated: flowers yellow: petals and sepals acute, rhombic-oblong, with a dark somewhat hairy gland; petals hairy and usually denticulate, 8 to 12 lines long: anthers  $1\frac{1}{2}$  or 2 lines long, shorter than the filaments: capsule 1 to 2 inches long. — Baker, l. c. 308, with syn. Guanajuato to Oaxaca.

31. *C. GHIESBREGHTII*. Flowers erect, white tinged with lilac, the sepals darkest: sepals and petals (6 to 8 lines long) with a somewhat hairy gland near the base; petals cuneate-obovate, obtuse, hairy below the middle: anthers  $1\frac{1}{2}$  lines long, little shorter than the filaments: capsule  $1\frac{1}{2}$  to 2 inches long. — Chiapas (n. 104, 661, Ghiesbreght).

\* \* \* Flowers unknown: capsule narrowly oblong, obtuse, loculicidally dehiscent at the summit: seed flat and horizontal in one row in each cell, with close white testa.

32. *C. CATALINÆ*. Stem 2 feet high, branching, from a small oblong-ovate corm: leaves and bracts very narrowly linear: ovary winged: capsule triangular, an inch or two long by 4 or 5 lines wide, very obtuse: seeds thin and very numerous, 2 lines in diameter; testa minutely pitted. — Santa Catalina Island (Paul Schumacher, June, 1878).

### 31. *UVULARIA*, Linn.

1. *U. PERFOLIATA*, Linn. Glauous throughout: stem  $\frac{1}{2}$  to  $1\frac{1}{2}$  feet high, with 1 to 3 leaves below the fork: leaves glabrous, glaucous beneath, oblong- to ovate-lanceolate, acute: perianth-segments 8 to 16 lines long, granular-pubescent within: stamens shorter than the styles, the tip of the connective acuminate: ovary somewhat triquetrous; capsule broader than high, the cells with two prominent acute ridges and horn-like projections. — Smith, Exot. Bot. 1. 97, t. 49. Canada to Florida and Mississippi.

2. *U. GRANDIFLORA*, Smith. Yellowish-green, not glaucous: stem naked or with a single leaf below the fork: leaves whitish-pubescent beneath, usually somewhat acuminate: perianth-segments smooth within or nearly so, 12 to 18 lines long: stamens exceeding the styles, obtusely tipped: ovary obtusely triangular; capsule obtusely lobed. — Exot. Bot. 1. 99, t. 51; Ker, Bot. Mag. t. 1112. Canada to Iowa and south to Georgia. *U. flava*, Smith (l. c., t. 50), appears to differ only in its brighter yellow flowers.

## 32. OAKESIA.

1. *O. SESSILIFOLIA*. Stem a foot high or less, naked or with a single leaf below the fork, glabrous: leaves oblong-lanceolate, acute at each end, minutely scabrous on the margin, pale, glaucous beneath: flowers 7 to 12 lines long, smooth within: anthers obtuse, shorter than the style: capsule stipitate, 10 lines long. — *Uvularia sessilifolia*, Linn.; Smith, Exot. Bot. 1. 101, t. 52; Sims, Bot. Mag. t. 1402; Lodd. Bot. Cab. t. 1262. *U. Floridana*, Chapm. Flora, 487. Canada (New Brunswick, Quebec) to Florida and Arkansas.

2. *O. PUBERULA*. Branches usually somewhat scabrous: leaves firmer and darker green, ovate to lanceolate, mostly rounded at base, very rough on the margin: capsule sessile or nearly so, 10 to 12 lines long, brown-dotted. — *Uvularia puberula*, Michx.; Lodd. Bot. Cab. t. 1260; Sweet, Fl. Gard. 2 ser. t. 21. Virginia to South Carolina.

## 33. STREPTOPUS, Michx.

1. *S. AMPLEXIFOLIUS*, DC. Glabrous throughout, glaucous, 2 or 3 feet high: leaves cordate at base, the margin rarely slightly scabrous: flowers greenish-white, 4 to 6 lines long: anthers cuspidate with a single slender awn: stigma scarcely lobed: berry thin-coated; cells 10–14-seeded. — *Uvularia amplexifolia*, Linn.; Hornem. Fl. Dan. t. 1515. *S. distortus*, Michx. *S. amplexicaulis*, Poir.; Baker, Journ. Linn. Soc. 14. 591. Alaska to N. California and across the continent, ranging south to New Mexico and Pennsylvania; also in temperate Europe and Asia.

2. *S. ROSEUS*, Michx. Lower and somewhat pubescent: leaves less cordate or only clasping, scabrous-ciliate: pedicels often all sessile (i. e. not geniculate upon a peduncle): flowers rose-purple, 3 or 4 lines long: anthers bicuspidate: stigma 3-cleft: berry with a rather thicker coat, the cells 6–8-seeded. — Fl. 1. 201, t. 18; Lodd. Bot. Cab. t. 1603; Baker, l. c. 592. *Uvularia rosea*, Pers.; Ker, Bot. Mag. t. 1489. *Hekorima rosea*, Raf. Alaska to Oregon and Canada (Labrador) and south to Georgia. Eschscholtz's specimens collected at Sitka and referred to *Kruhsea Tilingii*, Regel (*Smilacina streptopoides*, Ledeb.), belong to this species. On the other hand, the *S. roseus* of Wright's collection in Ochotsk Sea is the same as Tiling's plant (from the same locality) upon which *Kruhsea* was founded, but is properly a *Streptopus* (i. e. *S. Ajanensis*, Tiling).

3. *S. BREVIPES*, Baker, l. c. Glabrous throughout, very low and with very slender creeping rootstock: leaves not at all cordate nor

ciliate: fruit on pedicels 3 or 4 lines long, the cells 2-8-seeded. — Cascade Mountains, Washington Territory (Lyall); known only in fruit. Perhaps a reduced form of the last.

### 34. *PROSARTES*, D. Don.

\* Stigma 3-cleft: leaves rarely cordate at base.

+ Perianth very broad and gibbously truncate at base.

1. *P. MENZIESII*, Don. More or less woolly-pubescent: leaves ovate to ovate-lanceolate, narrowly acuminate or the lowest acute, often resinous-dotted: perianth-segments nearly erect, acute, 6 to 11 lines long: stamens a third shorter: style usually somewhat woolly: ovary nearly glabrous: capsule oblong-obovate, attenuate to a short subvillous beak; cells 1-2-seeded. — Linn. Trans. 18. 533; Baker, Journ. Linn. Soc. 14. 587. *Uvularia Smithii*, Hook. Fl. Bor.-Am. 2. 174, t. 189. California (Mendocino County) to British Columbia.

+ + Perianth narrower and more cuneate at base.

2. *P. LANUGINOSA*, Don, l. c. Woolly-pubescent: leaves oblong-lanceolate, narrowly acuminate: perianth-segments greenish, linear-lanceolate, acuminate, spreading, 6 or 7 lines long: stamens a third shorter: style and narrow ovary glabrous: capsule oblong-ovate, obtusish or with a very short stout beak, glabrous; cells 1-2-seeded. — Baker, l. c. 586, excl. vars. *Streptopus*, Michx. *Uvularia*, Pers.; Ker, Bot. Mag. t. 1490. Western New York to Georgia and Tennessee.

3. *P. MACULATA*, Gray. Pubescent: leaves oblong-lanceolate, acuminate: perianth-segments yellowish white, with purple dots, very narrow at base, lanceolate above and acute, 8 to 10 lines long, scarcely exceeding the stamens: style glabrous: ovary ovate, villous, with a single pair of ovules in each cell. — Amer. Journ. Sci. 2 ser. 47. 201. *Streptopus maculatus*, Buckley, same, 45. 170. Mountains of Tennessee and North Carolina.

4. *P. TRACHYCARPA*, Watson. More or less pubescent: leaves ovate to oblong-lanceolate, acute or rarely acuminate: perianth-segments whitish, slightly spreading, narrowly oblanceolate, acute, 4 to 6 lines long, about equalling the stamens: ovary broad: fruit broadly obovate, obtuse and rather deeply lobed, papillose; cells 2-6-seeded. — King's Rep. 5. 344; Baker, l. c. Saskatchewan to N. Idaho, Utah and Colorado.

\* \* Stigma entire: leaves mostly cordate-clasping.

5. *P. HOOKERI*, Torr. More or less rough-pubescent with short

usually spreading hairs: leaves ovate or sometimes oblong, acute or shortly acuminate: perianth usually rather broad at base, spreading; segments acute, 5 or 6 lines long, about equalling the stamens: ovary narrow, more or less pubescent; style glabrous: fruit obovate, obtuse; cells usually 2-seeded. — *Pacif. R. Rep.* 4. 144. *P. lanuginosa*, var. *Hookeri*, Baker, l. c. California (Coast Ranges, Marin County to Santa Cruz).

6. *P. TRACHYANDRA*, Torr. l. c. Resembling the last: leaves less deeply cordate, the upper ones often not at all so, and broader toward the apex: stamens a third shorter than the perianth; anthers minutely hispid: ovary glabrous: fruit glabrous, with a short stout beak. — *P. lanuginosa*, var. *trachyandra*, Baker, l. c. California (Sierra Nevada, from Tuolumne to Plumas County).

7. *P. OREGANA*. More or less woolly-pubescent: leaves ovate to oblong-lanceolate, long-acuminate: perianth-segments spreading, acute, narrowed below, very distinctly net-veined, 5 to 7 lines long, equalling or shorter than the stamens: fruit ovate, acutish, somewhat pubescent; cells 1-2-seeded. — *Uvularia lanuginosa*, var. *major*, Hook. *Fl. Bor.-Am.* 2. 174. Oregon and Idaho to British Columbia.

### 35. CLINTONIA, Raf.

\* Ovules a single pair in each cell: flowers small, umbellate.

1. *C. UMBELLATA*, Torr. Inflorescence villous-pubescent or glabrous: flowers 10 to 20 or more, suberect on slender pedicels, white with often a green or purplish spot at the tips; segments broadly spatulate, 3 or 4 lines long, about equalling the stamens: style slender: fruit small. — *Fl. N. York*, 2. 301; Baker, *Journ. Linn. Soc.* 14. 584. *Convallaria umbellulata*, Michx. *Smilacina umbellata*, Desf. *Ann. Mus.* 9. 53, t. 8. *S. borealis*, Ker, *Bot. Mag.* t. 1155. *Convallaria umbellata*, Poir. *Maianthemum*, Link. *C. multiflora*, Beck. New York to Georgia in the Alleghanies.

\* \* Ovules several pairs in each cell: flowers larger.

+ Flowers umbellate.

2. *C. BOREALIS*, Raf. Inflorescence woolly-pubescent or glabrate: flowers (3 to 6) nodding, greenish yellow; segments oblanceolate, 6 to 8 lines long: filaments pubescent or glabrous: style stout: fruit 3 or 4 lines in diameter; cells 6-8-seeded. — Baker, l. c. *Dracena borealis*, Ait. *Hort. Kew*, 1. 454, t. 5; Andr. *Bot. Rep.* t. 206. *Smilacina borealis*, Ker, *Bot. Mag.* t. 1403. Labrador to Winnipeg Valley, south to N. Carolina.



3. *C. ANDREWSIANA*, Torr. Scape a foot or two high, usually with a foliaceous bract and one or more few-flowered lateral fascicles: inflorescence more or less pubescent; terminal umbel many-flowered; pedicels slender: flowers suberect, deep rose-color; segments oblanceolate, gibbous at base, 4 to 7 lines long, exceeding the stamens and style: filaments pubescent: fruit 4 or 5 lines long; cells 8–10-seeded. — Pacif. R. Rep. 4. 150; Baker, l. c. California (Coast Ranges, Humboldt County to Santa Cruz).

+ + Flower solitary.

4. *C. UNIFLORA*, Kunth. More or less villous-pubescent throughout: scape mostly shorter than the leaves, usually with a very small bract: flower (rarely 2) white, pubescent, suberect; segments broadly oblanceolate, 9 to 12 lines long, exceeding the stamens: filaments pubescent: fruit 4 to 6 lines long; cells 6–10-seeded. — Baker, l. c. *Smilacina uniflora*, Menz.; Hook. Fl. Bor.-Am. 2. 175, t. 190. California (Calaveras and Humboldt Counties) to British Columbia.

### 36. SCOLIOPUS, Torr.

1. *S. BIGELOVII*, Torr. Leaves oval-elliptic to narrowly oblanceolate, 4 to 15 inches long, sessile or narrowed at base: pedicels (3 to 12) 3 to 8 inches long: outer perianth-segments several-nerved, the inner 3-nerved, 7 to 9 lines long: ovary linear-oblong; stigmas 2 lines long: capsule light-colored, 9 to 14 lines long, beaked by the stout style (2 or 3 lines long): seeds 1 to 1½ lines long. — Pacif. R. Rep. 4. 145, t. 22. California (Coast Ranges, Marin to Humboldt County).

2. *S. HALLII*. Leaves smaller (3 to 5 inches long), somewhat petioled: pedicels very slender, 2 inches long or less: ovary broader; style more slender and stigmas only a line long: capsule brown-purple, 5 lines long: rootstock and roots more slender. — *S. Bigelovii*, Gray, Proc. Amer. Acad. 8. 404. Oregon (Cascade Mountains, Hall). Flower unknown.

### 37. MEDEOLA, Gronov.

1. *M. VIRGINIANA*, Linn. Stem a foot or two high, floccose-woolly becoming glabrate: leaves oblong-lanceolate or uppermost ovate, acuminate, 5 to 9 in the lower whorl, 2 to 4 in the upper, nearly sessile: pedicels (3 to 10) slender, an inch long or less: perianth-segments 3 or 4 lines long, exceeding the stamens, shorter than the purple stigmas: berry 2 or 3 lines in diameter; cells usually

1-seeded. — Lam. Ill. t. 266, f. 2; Ker, Bot. Mag. t. 1316; Meehan, Nat. Fl. 2. 157, t. 40. *Gyromia Virginica*, Nutt. Canada to Florida and Arkansas.

### 38. TRILLIUM, Linn.

\* Ovary and fruit 6-angled and more or less winged. (Mature fruit very imperfectly known.)

+ Flowers sessile: the broad connective produced beyond the anther-cells.

1. *T. SESSILE*, Linn. Leaves sessile, broadly ovate or rhomboidal, acute, somewhat cuneate or sometimes broadly rounded at base,  $1\frac{1}{2}$  to 5 inches long: sepals spreading: petals narrowly lanceolate to oblanceolate, acute or acutish,  $\frac{1}{2}$  to 3 inches long, brown-purple or rarely greenish-white: stamens erect, usually exceeding the stout suberect stigmas; filaments  $1\frac{1}{2}$  lines long or less. — Curt. Bot. Mag. t. 40; Lodd. Bot. Cab. t. 875; Fl. Serres, t. 2311. *T. viride*, Beck. *T. discolor* (?), Chapman, Flora, 478. Pennsylvania to Wisconsin, south to Florida and Alabama.

Var. WRAYI. Petals spatulate, obtuse, greenish, an inch long. — *T. discolor*, Wray; Hook. Bot. Mag. t. 3097. Georgia.

Var. NUTTALLII. Upper stem and nerves of the leaves beneath rough-pubescent: petals linear-lanceolate, purplish-green with brown base, 2 inches long. — *T. viridescens*, Nutt. Trans. Amer. Phil. Soc. 2. 5. 155. Arkansas.

Var. CALIFORNICUM. Stouter: leaves broadly rhombic-ovate, 3 to 6 inches long: petals oblanceolate to rhombic-obovate, 1 to 4 inches long, purple or rose-color or white: anthers 6 to 9 lines long, usually considerably exceeding the stigmas. — Vars. *giganteum* and *chloropetalum*, Torr. in Pacif. R. Rep. 4. 151. California (San Luis Obispo northward) to Oregon.

Var. ANGUSTIPETALUM, Torr. l. c. Similar, but the leaves somewhat petiolate; petals narrowly oblanceolate to linear. — Var. *giganteum*, Hook. & Arn. Bot. Beechey, 402. California to Oregon; less frequent.

2. *T. RECURVATUM*, Beck. Leaves petioled, ovate to ovate-oblong, usually acute at both ends: sepals reflexed: petals oblong-lanceolate, narrowed to a claw at base, 9 to 18 lines long, brown-purple: stamens incurved, much exceeding the stigmas; filaments 2 or 3 lines long. — Am. Journ. Sci. 11. 178. *T. unguiculatum*, Nutt. l. c. Wisconsin to Indiana and Arkansas.

Var. (?) LANCEOLATUM. Leaves sessile, more narrowly lanceolate: sepals less strictly reflexed; petals more narrowly lanceolate or nearly

linear, with longer claws: filaments longer. — *T. lanceolatum*, Boykin in herb. Torr. Georgia and Alabama.

3. *T. PETIOLATUM*, Pursh. Stem very short, scarcely exerted from the basal sheaths: leaves ovate-elliptic to reniform, 3 to 5 inches long, with petioles as long or longer: sepals erect; petals purple, narrowly oblanceolate, an inch or two long: stamens with short filaments, exceeding the slender stigmas. — Hook. Fl. Bor.-Am. 2. 180, t. 192. Idaho, Oregon and Washington Territory.

+ — Flowers pedicellate: connective not produced.

++ Pedicel longer than the flower: filament shorter than the anther: leaves sessile or nearly so.

4. *T. ERECTUM*, Linn. Leaves very broadly rhombic,  $2\frac{1}{2}$  to 6 inches wide, shortly acuminate: pedicel usually more or less inclined or declinate: petals ovate to lanceolate, 9 to 18 lines long, brown-purple or often white or greenish or pinkish: stamens equalling or exceeding the stout distinct spreading or recurved stigmas. — Curt. Bot. Mag. t. 470, 1027, 3250; Lodd. Bot. Cab. t. 1838, 1850. *T. rhomboideum*, Michx., excl. var. *grandiflorum*. *T. fœtidum*, Salisb. Parad. t. 35. *T. pendulum*, Willd. Hort. Berol. t. 35; Regel, Gartenfl. t. 656. *T. purpureum*, Kinn. From Canada (Nova Scotia to Winnipeg Valley) to N. Carolina, Tennessee and Missouri. It is probably *T. obovatum*, Pursh, as respects his Canadian plant, and it is apparently also the plant of E. Siberia. The Japanese form is distinguished by a somewhat produced connective and very short stigmas.

5. *T. GRANDIFLORUM*, Salisb. Leaves less broadly rhombic-ovate,  $1\frac{1}{2}$  to 3 or 4 inches wide: pedicel erect or ascending: petals oblanceolate, often broadly so,  $1\frac{1}{2}$  to  $2\frac{1}{2}$  inches long, white turning rose-color or marked more or less with green: stamens with slender filaments and anthers, exceeding the very slender erect or suberect and somewhat coherent stigmas. — Parad. t. 1; Lodd. Bot. Cab. t. 1349; Regel, Gartenfl. t. 575. *T. rhomboideum*, var. *grandiflorum*, Michx. *T. erythrocarpum*, Curt. Bot. Mag. t. 855. Vermont to N. Carolina, west to Wisconsin and Kentucky. Sports occur with petiolate leaves or naked stems.

6. *T. OVATUM*, Pursh. Closely resembling the last; petals lanceolate or more narrowly oblanceolate; stigmas somewhat stouter and more recurved. — *T. obovatum*, Hook. Fl. Bor.-Am. 2. 180. *T. Californicum*, Kellogg, Proc. Calif. Acad. 2. 50, f. 2. From British Columbia southward in the Coast Ranges to Santa Cruz, California.

++ ++ Pedicel short : filament slender, about equalling the anther.

= Pedicel recurved or strongly declinate.

7. *T. CERNUUM*, Linn. Leaves sessile or nearly so, very broadly rhombic-ovate, 2 to 4 inches broad : petals white, ovate-lanceolate, 6 to 12 lines long : stamens with short anthers, shorter than the stout recurved distinct stigmas : fruit ovate, 3-beaked. — Curt. Bot. Mag. t. 954. British America (Newfoundland to Mackenzie River) to Georgia.

8. *T. STYLOSUM*, Nutt. Leaves ovate-lanceolate, acute at each end and shortly petiolate, 2 to 4 inches long : petals rose-colored, oblong, acute, strongly curved and undulate, 9 lines to 2 inches long : stamens much exceeding the slender somewhat united stigmas : fruit oblong, with a stout beak. — *T. nervosum* and *Catesbæi*, Ell. N. Carolina to Florida.

= = Pedicel erect. (Doubtful species.)

9. *T. PUSILLUM*, Michx. Stem 6 to 8 inches high : leaves sessile, lanceolate or oblong, obtuse,  $1\frac{1}{2}$  to 2 inches long : petals lanceolate, acutish, pale flesh-color, 8 to 10 lines long : sepals obtuse : stigmas slender, united below. — Chapm. Flora, 478. Pine-barrens of North and South Carolina. The description of *T. Texanum*, Buckl. (Proc. Acad. Philad. 1860, 443), from N. E. Texas, is essentially the same. Both plants are known only from the descriptions.

\* \* Ovary and fruit 3-lobed or angled, not winged : flowers pedicelled : leaves petiolate : the slender filaments about equalling the anthers.

10. *T. NIVALE*, Riddell. Low : leaves ovate to lanceolate, obtuse, an inch or two long : pedicel erect or declined, short : petals oblong or oblanceolate, obtuse or acutish, 6 to 15 lines long, white : stamens usually shorter than the long slender stigmas : fruit depressed globose, with 3 rounded lobes, 3 or 4 lines long. — Syn. Fl. W. States, 93. Western Pennsylvania to Kentucky, Iowa and Wisconsin.

11. *T. ERYTHROCARPUM*, Michx. Leaves ovate, acute or acuminate, 2 to 6 inches long : pedicel erect or inclined, often exceeding the flower : petals oblanceolate, often broad, acute or acuminate, wavy, white with purplish base, an inch long : stamens about equalling the very slender stigmas : ovary 3-angled : fruit broad-ovate, obtuse, 7 to 9 lines long. — Sweet, Fl. Gard. t. 212 ; Lodd. Bot. Cab. t. 1232 ; Hook. Bot. Mag. t. 3002. *T. undulatum*, Willd. *T. pictum*, Pursh. New Brunswick to Wisconsin and Georgia, on high mountains or in cold damp woods.

## 39. MELANTHIUM, Linn.

- \* Perianth-segments with a conspicuous double gland at the summit of the claw.

1. *M. VIRGINICUM*, Linn. Stem 3 to 5 feet high, leafy, rather slender: leaves linear, 4 to 10 lines wide, only the lowest sheathing: perianth-segments flat, ovate to oblong or slightly hastate,  $2\frac{1}{2}$  to 4 lines long: capsule ovate, half an inch long: seeds 10 in each cell, 2 or 3 lines long. — *M. Virginicum* and *monoicum*, Walt. *M. polygammum*, Desrouss. *Leimanthium Virginicum*, Willd. *Helonias*, Sims, Bot. Mag. t. 985. *Veratrum*, Ait. f. *Zygadenus*, Endl. *M. biglandulosum*, Bertol. Bot. Misc. 10. 34. From Canada to Carolina and Texas.

2. *M. LATIFOLIUM*, Desrouss. Leaves more oblanceolate, often 2 inches broad: perianth-segments undulate, 2 or 3 lines long, the very narrow claw nearly equalling the orbicular or ovate blade: capsule 6 to 8 lines long; styles more slender: seeds 4 to 8 in each cell, 3 or 4 lines long. — Lam. Dict. 4. 25. *M. hybridum*, Walt.? *M. racemosum*, Michx. *Leimanthium hybridum*, Schult. f. *Zygadenus hybridus*, Endl. Connecticut to South Carolina. The identity of Walter's *M. hybridum* is doubtful.

- \* \* Gland wanting: perianth-segments oblanceolate.

3. *M. PARVIFLORUM*. Stem rather slender, 2 to 5 feet high, sparingly leafy: leaves oval to oblanceolate (2 to 4 inches wide), on long petioles, only the lowest sheathing: perianth-segments oblanceolate or spatulate, 2 or 3 lines long, attenuate at base: stamens very short: capsule half an inch long; seeds 4 to 6 in each cell, 4 lines long. — *Veratrum parviflorum*, Michx.; Gray, Manual, 525. *Leimanthium monoicum*, Gray, Melanth. 116. *Zygadenus monæcus*, Kunth. Alleghanies (Virginia to S. Carolina).

## 40. VERATRUM, Tourn.

- \* Stem slender, sparingly leafy; leaves oblanceolate, only the lowest sheathing: flowers greenish purple; segments entire: ovary tomentose, soon glabrate: capsule ovate, acute, the cells few-seeded.

1. *V. WOODII*, Robbins. Stem slender, 2 to 5 feet high, sparingly leafy: leaves oblanceolate, 1 or 2 inches broad or more, on long petioles: panicle very narrow: pedicels 2 lines long or less, somewhat longer in fruit: perianth-segments nearly glabrous, oblanceolate, 3 or 4 lines long: stamens a little shorter, reddish: capsule a half-inch long. — Wood, Class-Book, 2 ed. 557; Gray, Manual, 526. Indiana to Missouri.

2. *V. INTERMEDIUM*, Chapman. Apparently very similar to the last: leaves narrower: panicle more open and slender: pedicels slender, 3 or 4 lines long, about equalling the flowers: perianth pubescent: fruit unknown. — Flora, 489. Middle Florida.

\* \* Stem stout, very leafy, the leaves broad-elliptical and sheathing: flowers yellowish-green or whitish, the segments serrulate or entire: ovary glabrous: capsule oblong-ovate, acute, many-seeded.

3. *V. VIRIDE*, Ait. Stem 2 to 7 feet high: leaves acute, the uppermost lanceolate and acuminate: branches of the simple panicle slender and more or less drooping: bracts foliaceous, lanceolate, usually nearly equalling the flowers: perianth greenish, adnate to the attenuate base of the capsule; segments oblanceolate, ciliate-serrulate, 4 to 6 lines long: stamens 2 or 3 lines long: capsule an inch long. — Bigel. Med. Bot. 2. 121, t. 33. *Melanthium braeteolare*, Desr. *Helonias viride*, Ker, Bot. Mag. t. 1096. *V. parviflorum*, Bong. *V. Eschscholtzii*, Gray. Georgia to Canada, and thence to Washington Territory and Alaska.

4. *V. CALIFORNICUM*, Durand. Similar: upper leaves lanceolate, but rarely acuminate: branches of the sometimes compound panicle ascending: bracts ovate-lanceolate, submembranous, usually little exceeding the pedicels: perianth-segments broader, obtuse, whitish with greener base, often denticulate above, 3 to 8 lines long, slightly adnate to the capsule: stamens 3 to 5 lines long: capsule an inch long or more. — Journ. Philad. Acad. 3. 103. *V. album*, auth. Colorado and Wyoming to N. California and Oregon.

\* \* \* Stem stout and leafy; leaves oblong to lanceolate, mostly sheathing: perianth-segments fimbriate, somewhat biglandular: capsule obovate, obtuse, few-seeded.

5. *V. FIMBRIATUM*, Gray. Leaves narrowed at base, 6 to 18 inches long by 2 to 6 wide or more, acute or acuminate: branches of the panicle spreading: bracts ovate: perianth-segments rhombic-ovate, 3 to 5 lines long: capsule depressed and somewhat emarginate, 4 lines long: seeds oblong, scarcely winged. — Proc. Amer. Acad. 7. 391. California (Mendocino County).

#### 41. *STENANTHIUM*, Gray.

1. *S. ANGUSTIFOLIUM*, Gray. Stem leafy, 3 or 4 feet high, very slender: leaves 2 or 3 lines broad: panicle elongated, nearly simple, very open; branches slender and flexuous: flowers polygamous or subdicæious, nearly sessile or the fertile on short pedicels; peri-

anth-segments spreading, linear-lanceolate, 2 or 3 lines long: capsule strongly reflexed, narrowly oblong-ovate,  $3\frac{1}{2}$  lines long including the turbinate base, with spreading beaks: seeds angled, not margined, 2 to  $2\frac{1}{2}$  lines long. — Am. Journ. Sci. 42. 46, and Manual, 525. *Helonias graminea*, Sims, Bot. Mag. t. 1599. *Veratrum angustifolium*, Pursh; Gray, Rev. Melanth. 120. *Xerophyllum gramineum*, Nutt. Gen. 1. 235. Alleghanies, from Virginia to S. Carolina.

2. *S. ROBUSTUM*. Resembling the last: stem stout, leafy, 3 to 5 feet high, erect: leaves 4 to 10 lines broad: panicle or raceme often 2 feet long, frequently compound with numerous slender branches: perianth-segments 3 or 4 lines long, white or green: capsule erect, ovate, 4 lines long, with recurved beaks: seeds (immature) somewhat longer. — Pennsylvania to Ohio, Tennessee and South Carolina. It has been ordinarily included in the last.

3. *S. OCCIDENTALE*, Gray. Stem slender, a foot or two high, sparingly leafy: leaves linear to oblanceolate (3 to 12 lines wide): raceme simple or branched at base: flowers all perfect, campanulate, greenish-purple, 4 to 7 lines long, about equalling the pedicels; segments linear-lanceolate, with recurved tips: capsules at length erect, 6 to 8 lines long, attenuate into the elongated slender styles: seeds linear, flat and winged, 3 or 4 lines long. — Proc. Amer. Acad. 8. 405. Oregon to British Columbia. A Mexican species, *S. FRIGIDUM*, Kunth (*Veratrum*, Cham. & Schlecht.), tall, with large purple flowers and conspicuous bracts, seems rightly referred to this genus.

#### 42. ZYGADENUS, Michx.

\* Glands 2, orbicular, above the broad claw: root rhizomatous: flowers perfect.

1. *Z. GLABERRIMUS*, Michx. Stem 2 to 4 feet high, leafy: leaves 2 to 6 lines broad: panicle broad, with ovate greenish bracts: perianth adnate to the base of the ovary: segments 6 lines long, oblong-lanceolate; glands conspicuous: seeds linear, scarcely margined,  $2\frac{1}{2}$  lines long. — Fl. 1. 214, t. 22. *Helonias bracteata*, Sims, Bot. Mag. t. 1703; Lodd. Bot. Cab. t. 1330. *Helonias glaberrima*, Link. Virginia to Florida and Alabama.

\* \* Gland covering more or less of the base of the perianth-segments: bulb ovate; coats membranous.

← Flowers rather large, mostly perfect.

2. *Z. ELEGANS*, Pursh. Stem  $\frac{1}{2}$  to 3 feet high: leaves glaucous, 2 to 6 lines broad: raceme simple or sparingly branched below, often

few-flowered: bracts ovate-lanceolate, usually purplish: perianth adnate at base; segments broad, greenish, 4 or 5 lines long, the inner abruptly contracted to a broad claw; gland obcordate: styles about 2 lines long or more: seeds oblong, angular, not margined, 2 lines long. — *Helonias glaberrima*, Ker, Bot. Mag. t. 1680. *Z. glaucus*, Nutt.; Lindl. Bot. Reg. 24, t. 67. *Z. chloranthus*, Richards. *Z. commutatus*, Schult. *Anticlea glauca*, Kunth. From Canada (New Brunswick) and Illinois to Oregon and Behring Straits; southward in the mountains to New Mexico and Nevada.

3. *Z. FREMONTII*, Torr. Very similar, but less glaucous: leaves an inch broad or less: bracts mostly green: perianth free from the ovary, 3 to 7 lines long; gland irregular and notched on its upper margin: styles short (about 1 line long): capsule longer (6 to 12 lines): seeds shorter. — Pacif. R. Rep. 7. 20 (as *Z. Douglasii*). *Anticlea Fremontii*, Torr. in same, 4. 144. California (Coast Ranges, San Diego to Humboldt County).

4. *Z. NUTTALLII*, Gray. Stem stout, 2 feet high: leaves 3 to 8 lines broad: racemes simple or rarely paniced, rather densely flowered, with narrow membranous bracts: perianth free from the ovary; segments 3 to 5 lines long, not unguiculate, with an ill-defined gland at base: stamens free: capsule half an inch long: seeds large (3 lines long), usually flattened. — Manual, 525. *Amianthium Nuttallii*, Gray, Rev. Melanth. 123, excl. var.  $\beta$ . *Amiantanthus Nuttallii*, Kunth. Texas to Colorado.

+ + Flowers smaller, polygamous.

5. *Z. VENENOSUS*. Stem slender,  $\frac{1}{2}$  to 2 feet high: leaves rarely over 2 or 3 lines broad, scabrous, the cauline not sheathing: raceme simple, short, with narrow scarious bracts: perianth free from the ovary; segments triangular-ovate to elliptical, obtuse or rarely acutish, 2 or 3 lines long, all abruptly contracted to a short glandular claw, the blade rounded or subcordate at base; gland extending slightly above the claw with a well-defined irregular margin: stamens somewhat adnate to the claw: pedicels suberect in fruit: capsule 4 to 6 lines long: seeds  $1\frac{1}{2}$  to  $2\frac{1}{2}$  lines long. — California (Monterey and Mariposa Counties) to British Columbia and east to Utah and Idaho. Bulb poisonous. The Coast Range form is usually stouter, with a larger occasionally compound raceme. Hitherto referred to the last species.

6. *Z. PANICULATUS*, Watson. Very similar: usually stout: leaves 3 to 8 lines broad, usually all sheathing: raceme compound: perianth-



segments deltoid, acute or acuminate, with a short claw; gland less definitely margined, often reaching nearly to the middle of the blade: fruiting pedicels spreading: capsule  $\frac{1}{2}$  to 1 inch long: seeds 3 to 5 lines long. — King's Rep. 5. 344. *Amianthium Nuttallii*, var.  $\beta$ , Gray, Rev. Melanth. 121. *Helonias paniculata*, Nutt. Journ. Philad. Acad. 7. 57. California (east slope of Sierra Nevada) and Idaho to Utah and the Sackatchewan.

\* \* \* Gland obscure or almost wanting: perianth small, rotate or reflexed: bulb narrow; coats becoming fibrous.

7. *Z. LEIMANTHOIDES*, Gray. Stem leafy, 1 to 4 feet high, from a narrow oblong bulb: leaves 2 to 4 lines broad: racemes paniced, rather dense and many-flowered: perianth-segments oblong, not unguiculate, 2 lines long, adherent to the base of the ovary, white becoming greenish or purplish: capsule 4 lines long, the cells slightly divergent at top: seeds 4 in each cell, 3 lines long, somewhat margined below. — Manual, 525. *Amianthium*, Gray, Rev. Melanth. 125. *Amiantanthus*, Kunth. New Jersey to Georgia.

8. *Z. ANGUSTIFOLIUS*. Resembling the last: leaves 2 or 3 lines broad: raceme simple: perianth free from the ovary: capsule more oblong (5 lines long), the cells not at all divergent: seeds about 4 lines long. — *Helonias*, Michx. *Amianthium*, Gray, l. c. 124; Chapm. Flora, 490. *Amiantanthus*, Kunth. N. Carolina to Florida and Alabama.

Two Mexican species are described, viz.: *Z. VOLCANICUS*, Benth. (Pl. Hartw. 96), with elongated grass-like leaves, a rather tall slender leafy stem, and flowers (3 lines long) on long divaricate pedicels in open lax paniced racemes, the perianth adnate to the base of the capsule; and the quite doubtful *Helonias virescens*, HBK. (*Anticlea Mexicana*, Kunth), described as low, with a very short somewhat branched raceme of very small whitish flowers. But for the branching raceme it might be suspected of belonging to *Schœnocaulon*. The *Zygadenus Sibiricus*, Gray (*Anticlea*, Kunth), should probably be referred to *Stenanthium*, though the segments are glandular.

### 43. SCHÆNOCAULON, Gray.

1. *S. GRACILE*, Gray. Scape very slender, 2 or 3 feet high: leaves a line or two wide: flowers green, at length scattered in a spike 4 to 6 inches long; segments narrowly oblong, a line long or less: filaments very slender: capsule nearly sessile, 4 lines long or more; cells about 7-seeded. — Rev. Melanth. 127. *Helonias* (?) *dubia*, Michx. Southern Georgia to Florida.

2. *S. DRUMMONDII*, Gray. Stout, 1 to 3 feet high : leaves 1 to 3 lines broad : flowers green, in a spike-like raceme 4 to 8 inches long ; segments narrowly oblong-lanceolate,  $1\frac{1}{2}$  lines long : filaments stout, subclavate-filiform : fruiting pedicels a line long : capsule erect, narrow, a half-inch long ; cells 4-6-seeded. — Bot. Beechey, 388. *S. Texanum*, Scheele, Linnæa, 25. 262. Texas.

*Mexican Species.*

3. *S. CARICIFOLIUM*, Gray. Scape stout, a span high, much shorter than the very narrow flexuous leaves : flowers green, in a raceme 2 inches long ; segments oblanceolate,  $1\frac{1}{2}$  lines long : filaments rather slender : fruiting pedicels a line long : capsule ovate, a half-inch long : seeds large, 2 in each cell. — Bot. Beechey, 388. *Veratrum*, Schlecht. Ind. Sem. Hal. 1838 (Linnæa, Litt.-Ber. 1839, 100). Coulter, n. 1568 ; Gregg, n. 214 ?

4. *S. OFFICINALE*, Gray, l. c. Scape 2 to 4 feet high : leaves 4 to 6 lines broad : raceme dense, becoming 6 to 18 inches long : flowers nearly white ; segments  $1\frac{1}{2}$  lines long, narrowly oblong : filaments stout : fruiting pedicels 2 lines long : capsule ovate-oblong ; cells 2-4-seeded. — *Veratrum*, Schlecht. *Helonias*, Don. *Asagæa*, Lindl. Mexico to Venezuela. There appear to be some other unnamed species, allied to *S. Drummondii* and *caricifolium*.

44. *AMIANTHIUM*, Gray.

1. *A. MUSCÆTOXICUM*, Gray. Stem  $1\frac{1}{2}$  to 4 feet high : leaves shorter, 3 to 15 lines broad : raceme oblong-pyramidal, 2 to 4 inches long ; pedicels 4 to 8 lines long, with short ovate membranous bracts : perianth-segments spreading, 2 lines long, equalling the slender filaments : capsule broader above than long (scarcely 3 lines) : seeds 1 to  $1\frac{1}{2}$  lines long. — Rev. Melanth. 122, with syn. *Melanthium*, Walt. *M. densum*, Desr. ; Lam. Ill. t. 269, f. 3. *Helonias læta*, Ker, Bot. Mag. t. 803, 1540 ; Lodd. Bot. Cab. t. 998. *H. erythrosperma*, Michx. New Jersey to Florida, Kentucky and Arkansas.

45. *HELONIAS*, Linn.

1. *H. BULLATA*, Linn. Stem stout, 1 to 2 feet high, leafy and sheathed with broad bracts at base, and with small submembranous bracts above : leaves numerous, evergreen, 6 to 12 inches long : raceme an inch or two (becoming 4 to 6 inches) long : perianth-segments 3 lines long, about equalling the pedicels and capsules : seeds 2 lines

long. — Curt. Bot. Mag. t. 747; Andr. Bot. Rep. t. 352; Lodd. Bot. Cab. t. 961; Meehan, Nat. Fl. 1. 33, t. 9. *H. latifolia*, Michx. N. Jersey to Virginia.

#### 46. CHAMÆLIRIUM, Willd.

1. *C. CAROLINIANUM*, Willd. Stem 1 to 4 feet high: lower leaves spatulate-oblongate, 2 to 6 inches long, the cauline narrower: raceme often a foot long or more; the staminate with slender pedicels 1 to 3 lines long, the fruiting pedicels stouter and more scattered: capsule 4 to 6 lines long: seed about 3 lines long. — *Veratrum luteum*, Linn. *Helonias pumila*, Jacq. Icon. Rar. t. 253. *H. lutea*, Ait. f.; Ker, Bot. Mag. t. 1062. *Helonias dioica*, Pursh; Gray, Rev. Melanth. 132, with syn. *Chamælirium luteum*, Gray, Manual, 527. Canada to Georgia, and west to Nebraska and Arkansas.

#### 47. TOFIELDIA, Huds.

\* Glabrous; inflorescence centrifugal: pedicels mostly solitary: seeds not appendaged.

+ Dwarf, mostly arctic or alpine: raceme short, few-flowered.

1. *T. PALUSTRIS*, Huds. Stem naked and scape-like, 2 to 6 inches high: leaves  $\frac{1}{2}$  to  $1\frac{1}{2}$  inches long by about a line broad: raceme subglobose or from 6 to 12 lines long in fruit: pedicels minutely involucrate at the very base, a line long in fruit: perianth-segments spatulate, two thirds of a line long, shorter than the round-ovate capsule: seeds oblong, quadrangular,  $\frac{1}{3}$  line long. — *T. borealis*, Wahl. *Narthecium pusillum*, Michx. Lake Superior, Rocky Mountains of British America and to Greenland: Europe.

2. *T. COCCINEA*, Richards. Similar, but the stem (an inch or two high) with usually two leaves: raceme subglobose, with very short pedicels: involucre at the base of the flower: perianth-segments narrower, often purplish, nearly equalling the purple capsule: seeds linear, acute at each end, and slightly longer. — Hook. & Arn. Bot. Beechey, 130, t. 29<sup>bis</sup>. Arctic America.

Var. MAJOR, Hook. Taller, with larger and looser raceme (a half-inch long); the lower pedicels a line long or more, with nodding capsules: seeds a little longer. — On Mackenzie's River.

+ + Tall, with long many-flowered racemes.

3. *T. GLABRA*, Nutt. Stem 1 to 3 feet high, 2-3-leaved; raceme 2 to 8 inches long: pedicels sometimes in pairs, about equalling the whitish flowers (2 lines long), involucrate near the flower: perianth-segments

oblong-oblongeolate, equalling the oblong-ovate capsule: seeds linear. — *T. glaberrima*, MacBride. N. and S. Carolina; "Arkansas."

\* \* Stem and inflorescence pubescent: pedicels mostly fascicled: seeds more or less caudate. — § TRIANTHA, Nutt.

4. *T. GLUTINOSA*, Willd. Glutinous-pubescent: stem slender,  $\frac{1}{2}$  to  $1\frac{1}{2}$  feet high: leaves 2 or 3 lines broad: raceme short ( $\frac{1}{2}$  to 2 inches): pedicels (2 lines long in fruit) bearing the scarcely lobed involucre near the flower: perianth not becoming rigid: capsule thin and light-colored, oblong,  $2\frac{1}{2}$  lines long, shortly beaked: seeds minute, with close brownish testa, and a contorted tail at each end. — Smith, Trans. Linn. Soc. 12. 246, t. 8, f. 2; Hook. Fl. Bor.-Am. 2. 179, t. 191. *Narthecium*, Michx. Alaska to Oregon, Wyoming and Canada (to New Brunswick), and in the Alleghanies to North Carolina.

5. *T. PUBENS*, Pers. Pubescence more scabrous: stem 1 to 3 feet high: perianth becoming rigid about the firm dark-colored ovate and long-beaked capsule: seeds larger ( $\frac{2}{3}$  line long), with a short white appendage at each end. — Hook. Bot. Mag. t. 3859. *Melanthium racemosum*, Walt. *M. aspericaule*, Poir. *Narthecium pubens*, Michx. *Narthecium* (?) *scabrum*, Raf. New Jersey to Florida and Alabama.

6. *T. OCCIDENTALIS*. Stem (1 to 2 feet high) and pedicels below the involucre viscid-pubescent: raceme an inch long, and pedicels becoming 3 to 5 lines long: involucre 3-lobed nearly to the middle, often reddish: perianth  $2\frac{1}{2}$  or 3 lines long: capsule thin, obovate, 3 or 4 lines long, long-beaked: seeds angular-ovate, with loose white spongy testa, and a slender tail at the outer end nearly as long as the body. — N. California (Mendocino County, n. 1022, Kell. & Harf.) to Washington Territory (Cascade Mountains, Lyall).

#### 48. PLEEA, Michx.

1. *P. TENUIFOLIA*, Michx. Glabrous: stem a foot or two high: leaves perennial, rather rigid, 1 to  $1\frac{1}{2}$  lines wide, the cauline (2 or 3) sheathing: raceme about 6-flowered, the pedicels (an inch long or more) about equalling the conspicuous leafy bracts: perianth-segments 6 lines long, twice longer than the stamens and exceeding the capsule: seeds a line long, shorter than the contorted tail. — Flora, 1. 245, t. 25; Sims, Bot. Mag. t. 1956. North Carolina to Florida.

#### 49. NARTHECIUM, Moehr.

1. *N. AMERICANUM*, Ker. Stem a foot high or more: leaves a line wide, 7-9-nerved: raceme dense, an inch or two long: perianth-

segments narrowly linear, 2 to  $2\frac{1}{2}$  lines long, scarcely exceeding the stamens: filaments covered nearly to the top with dense tangled wool: capsule 5 lines long: seeds  $\frac{3}{4}$  line (or with the tails 3 to 4 lines) long. — Bot. Mag. t. 1505; Baker, Journ. Linn. Soc. 15. 351. *N. ossifragum*, var. *Americanum*, Gray, Manual, 536. New Jersey.

2. *N. CALIFORNICUM*, Baker, l. c. Leaves usually 7-nerved,  $1\frac{1}{2}$  lines broad: raceme open, 3 to 5 inches long: perianth-segments linear-lanceolate, 3 or 4 lines long, a third longer than the stamens: hairs upon the filaments ascending: seeds more numerous (10 to 15 in each cell), a line long (5 lines including the tails). — *N. ossifragum*, var. *occidentale*, Gray, Proc. Amer. Acad. 7. 391. Northern California (Mendocino and Sierra Counties).

#### 50. XEROPHYLLUM, Michx.

1. *X. SETIFOLIUM*, Michx. Stem 1 to 4 feet high: leaves a line broad or less: raceme becoming 6 inches long or more: perianth-segments oblong-ovate, 3 lines long, exceeding the stamens: styles longer than the ovary: capsule elliptic-oblong, obtuse, 2 lines long: seeds 2 in each cell, not at all appendaged. — *Helonias asphodeloides*, Linn.; Curt. Bot. Mag. t. 748; Lodd. Bot. Cab. t. 394. *X. asphodeloides*, Nutt.; Gray, Manual, 526. New Jersey to Georgia.

2. *X. TENAX*, Nutt. Stem 2 to 5 feet high: leaves about 2 lines broad, often 2 or 3 feet long: raceme becoming a foot or two long, with usually longer pedicels (mostly 1 to 2 inches): perianth-segments oblong, 4 or 5 lines long, scarcely equalling the stamens: styles exceeding the ovary, 2 lines long: capsule broadly ovate, acute, loculicidally 3-valved, nearly 3 lines long: seeds 2 to 4 in each cell, narrowly oblong, 2 lines long, thinner and narrower at the upper end. — *Helonias tenax*, Pursh, Fl. 1. 243, t. 9. *X. setifolium*, Lindl. Bot. Reg. t. 1613. California (Monterey and Plumas Counties) to British Columbia (Lyall).

3. *X. DOUGLASII*. Pedicels shorter ( $\frac{1}{2}$  to  $1\frac{1}{4}$  inches long): flowers smaller, the segments ( $2\frac{1}{2}$  lines long) exceeding the stamens: styles a line long: capsule cordate-ovate, 2 lines long, 6-valved, the abruptly acute cells separating and then dehiscing: seeds shorter and broader. — *X. setifolium*, var., Gray, Proc. Amer. Acad. 8. 405. Collected by Douglas, probably in Oregon, and distributed with his specimens of the last species. Also found by Hall (n. 533) near the Columbia River, and by Hayden in the mountains of Montana on the headwaters of the Yellowstone.

*Notes upon the Tribes, etc., — their Affinities and Geographical Distribution.*

The entire order of *Liliaceæ* includes about 180 genera and 1900 species, of which 50 genera and 235 species are found in the United States and northward; Mexico adds four genera and 40 species, and South America 26 additional genera and 58 species. The total of American representatives of the order is 80 genera and 333 species. At least 60 of these genera are peculiar to America, while only eight of the species are common to the Old and New World. The West Indies and all of South America to the east of the Andes are almost wholly destitute of species, the order being confined in that continent mainly to the western slope of the Andes, from Peru to Patagonia.

Taking up the tribes in their sequence, the *Alliæ* are represented principally by a single genus, *Allium*, by far the largest and most widely distributed of all the genera of the order. It numbers about 270 species, of which 220 are found in the northern temperate and warm regions of the Old World. No species occur in Australia, and probably none in tropical or Southern Africa. In the New World are about 50 species, mostly in the western United States, a very few Mexican, and a few in South America. Of the two other genera of the tribe, both small, *Nectaroscordium* belongs to the Mediterranean region, and *Nothoscordum* to the warmer portions of both western continents. The subdivisions of *Allium*, as a whole, are not satisfactorily defined, and a careful and thorough revision of this most difficult genus is still greatly needed. Some of the Old World sections are not represented in America, and on the other hand several of our western groups are peculiar. The eastern *A. tricoccum* also is very distinct from all our other species, with apparently some near allies in Europe and Asia.

The *Gillesiæ*, a very remarkable tribe of Chilian plants, including half a dozen mostly monotypical genera, appear to be most nearly related to the *Alliæ*.

The *Milleæ* are exclusively confined to the western portion of North and South America, only *Androstephium* ranging so far east as Kansas and Texas. The genus *Milla* must be limited to the one species *M. biflora*, all the South American species that have been referred to it probably belonging to *Leucocoryne*, the southern counterpart to the Californian *Brodiaea* and numbering as many species. The genus *Muilla* (the name an inversion of *Allium*) is formed for a plant that has usually been placed with the *Alliæ*, but which has not

the characters of that tribe. In the Old World the only group corresponding to the *Milleæ* is found in the *Agapantheæ* of the Cape of Good Hope.

The genus *Leucocrinum* and the little known Mexican *Weldenia* form an anomalous tribe, which resembles, and not very remotely, the *Massoniæ* of the Cape.

The *Hyacintheæ* and *Scilleæ* (hardly separable as tribes) are limited almost entirely to Europe (with Western Asia) and Africa, two thirds of the 365 species being African. A half-dozen species are found in the East Indies, while in the New World these tribes are represented in the northern continent only by the two species of *Camassia*, and in Chili by a single species, referred to *Ornithogalum*, but probably distinct. As concerns these American species, the one character of a scapose raceme should not separate them from the *Phalangieæ*.

Of the other tribes (or subtribes) having a racemose-paniculate inflorescence and capsular fruit, the *Asphodeleæ* alone (with 40 species) are confined to the Mediterranean region and Western Asia, with a single genus and species in China and Japan. The remainder, the *Phalangieæ*, *Conanthereæ*, *Eriospermeæ*, *Chlorophyteæ* and *Cæsieæ*, belong on the other hand as exclusively to Africa and Australia, but are represented by a considerable number of small genera in the western and warmer portions of North and South America. One genus, *Schœnolirion*, is peculiar to the Southern Atlantic and Gulf States. The Californian species hitherto united with it is here separated under a genus dedicated to Hon. S. Clinton Hastings of San Francisco, whose active interest and generous liberality in behalf of the "Botany of California" deserve at least this recognition. The chiefly African genus *Anthericum*, as extended by Mr. Baker, is doubtless too comprehensive, and the Mexican species referred by him to the subgenus *Hesperanthes* seem to be sufficiently well characterized to form a distinct genus. Several white-flowered species of Mexico and South America are also referred by him to *Anthericum*; the imperfect material at hand does not authorize any other disposal of them, as is moreover the case with the two South American species of *Chlorophyton*, a similar large African genus with a few representatives in Australia and India. The Californian *Odontostomum* is very anomalous in its characters.

Of the baccato-capsular tribes, the *Convallariæ* (50 species) belong to the whole northern temperate zone, and especially to Asia, only *Smilacina* extending southward into the tropics of America. In Eastern Asia are also found the small allied groups *Liriopeæ* and

*Aspidistreae*. The Asparagineous tribes proper (with 180 species) are not represented in America, but are peculiar to Africa (with the Mediterranean region), Australia and Southern Asia, only such outlying genera as *Astelia*, *Luzuriaga* and *Herreria* occurring in South America. The *Nolineae* may be considered as taking their place in North America.

The *Hemerocallideae* (36 species), of the same Old World region as the *Asparagineae*, are represented in America by the one species of *Hesperocallis* in Arizona, which may be included in the tribe notwithstanding the anomalous character of the seeds and root. The *Yuccae*, of Mexico and the adjacent warm dry region of the United States, in like manner replace the *Aloineae* and *Sansevieriae* of Africa and Southern Asia.

The Liliaceous tribes are in general very polymorphous in their characters. The principal one, the *Lilieae* (of 205 species), which is peculiar to the northern temperate zone and with four of the seven genera common to both continents, may be divided into nearly as many subtribes as genera. *Lloydia* and *Gagea*, chiefly Asiatic, in some respects resemble the *Phalangieae*, while *Calochortus*, of California and Mexico, and including several well-marked subgenera, is differentiated even more widely in the direction of the *Melanthaceae*. In the southern hemisphere the only approach to this tribe is found in the *Philesiae* of two monotypical genera in Chili and Patagonia.

The tribe *Uvulariae*, of a dozen small genera and about 40 species, is more widely distributed in its types, inasmuch as besides the seven genera of temperate North America and Asia (one species of *Streptopus* ranging westward from America to Central Europe), Africa and S. Asia have a representative in the genus *Gloriosa*, Australia in *Burchardia* and its allies, and Chili in *Callixene*. The division of *Uvularia* itself, which seems to be required, affords an opportunity to honor the memory of the lamented botanist, Mr. William Oakes, whose persistent zeal in investigating the flora of the fields and mountains of his native New England makes appropriate the union of his name with one of the plants which he himself knew so well.

The *Trillieae* are a small tribe exclusively northern, the principal genus *Trillium* American (with one species entering E. Asia) but represented in Asia by two nearly allied genera, *Paris* and *Trillidium*, of which the first also occurs in Europe. Less near are the two other genera *Medeola* and *Scoliopus*, which occupy respectively the eastern and western coasts of North America. The tribe has no counterpart in the southern hemisphere.



The *Melanthaceæ* form the least of the three divisions of the order, numbering 28 genera and only 112 species. The *Colchiceæ* belong exclusively to Europe and the Mediterranean region. The *Veratreeæ* are almost as exclusively North American, a few species occurring in Eastern Asia, and *Veratrum* extending into Europe. It is the only tribe that in North America enters Mexico, and the only one that finds representation in the southern hemisphere in the allied *Anguillarieæ* of Africa and Australia. The *Helonieæ* have two monotypical genera in the Atlantic States, and three others (including *Metanartheceium*) in Japan. The *Tofieldiæ*, occupying the northern temperate zone, seem to have a solitary representative (a species of *Tofieldia*) in the mountains of Peru, while *Hewardia* of Australia is in some respects analogous to *Pleea* of the Southern Atlantic States.

In general and in conclusion, this hasty and imperfect sketch of the more prominent facts in respect to the distribution of the order, while showing the evident connection of the northern floras of the continents, also indicates a certain, though more distant, relationship (however it may be accounted for) between the flora of Pacific America and that of South Africa and of Australia.

---

## II. *Descriptions of some new Species of North American Plants.*

**THALICTRUM POLYCARPUM.** Rather stout, 2 or 3 feet high or more, glabrous throughout: leaves with short petioles or the upper sessile; leaflets variable, 3 to 12 lines long, the lobes acutish to acuminate: panicle narrow, often small; the staminate usually crowded, with flowers on short pedicels: anthers linear, acute, on very slender filaments: styles scarcely attenuate upward: fruit usually in dense heads, compressed, broadly oblong-obovate or obovate, abruptly acute, subreticulately 3-5-nerved,  $2\frac{1}{2}$  or 3 lines long: seed linear, terete, nearly 2 lines long. — *T. Fendleri*, var. (?) *polycarpum*, Torr. in Pacif. R. Rep. 4. 61, in part. *T. Fendleri*, Brew. & Wats. Bot. Calif. 1. 4, mainly. Pacific Coast Ranges from Monterey (or Los Angeles?) to Oregon (Washington County, J. Howell); also in the Sierra Nevada. — *T. OCCIDENTALE*, Gray, is a similar species, with more slender open panicles, the staminate very diffuse with slender elongated pedicels; style attenuate; fruit usually few (1 to 6) in each head, narrowly oblong (3 to 4 lines long) and attenuate at each end; seed nearly 3 lines long. It ranges from British Columbia to W. Montana and N. E. California (Plumas County, Mrs. Austin).

The leaflets are somewhat larger, rarely with a slight minute puberulence beneath. — *T. FENDLERI*, Gray, of the Rocky Mountains (Colorado and Utah to New Mexico), is a rather low slender species, glabrous or somewhat pubescent, with usually small leaflets (2 to 9 lines long) and an open spreading panicle; anthers setosely acuminate; fruit slightly glandular-puberulent, oblong to ovate, acuminate, 2 or 3 lines long; seed broader and somewhat flattened,  $1\frac{1}{2}$  lines long. *T. Wrightii* appears to be a form with fruit smaller than usual.

*RANUNCULUS AMBIGENS*. In wet places, glabrous, the ascending stems stout and elongated, often rooting at the lower joints: leaves oblong- to linear-lanceolate, 2 to 5 inches long, acute, sparingly denticulate, petiolate; petiole margined, clasping: petals (2 lines long) but little exceeding the sepals: carpels in small ovate heads, turgid, rarely a line long, with a long straight narrowly subulate beak. — *R. alismæfolius*, Benth. Pl. Hartw. 295, as to the eastern plant, and Gray, Manual, 41. From Maine to Illinois. — *R. ALISMÆFOLIUS*, Geyer, to which this has been referred, has an erect stem (a foot high or more, the alpine form often dwarf) from a fleshy-fibrous root, glabrous excepting the hairy basal sheaths; leaves entire, the radical on elongated petioles, the few cauline sessile or nearly so; petals larger (2 to 6 lines long); fruiting heads usually larger, the more flattened carpels over a line long, with a short narrow beak. It is found in the mountains from Colorado and Wyoming to California and Oregon. The var. *montanus* of King's Rep. is the typical subalpine form as found by Geyer.

*DENTARIA CALIFORNICA*. Stem simple or branched, about six inches high: leaves thick, 2 to 4 on the upper part of the stem, on short petioles, ovate to round-reniform, cordate or sometimes cuneate at base, obscurely sinuate-dentate or coarsely and sharply or laciniately toothed, very rarely 3-lobed: petals rose-colored, 4 to 6 lines long, more than twice longer than the purplish sepals: pedicels spreading (3 to 9 lines long): pod 12 to 18 lines long by a line wide, attenuate into a very slender style (2 lines long or more), — or in Var. *PACHYSTIGMA*, the pod much stouter and broader, with a very short stout style. — Mountains of Plumas County, California; J. G. Lemmon, Mrs. R. M. Austin, and Mrs. M. E. P. Ames. The root is a small deep-seated tuber. Referred to in the Botany of California under *Cardamine paucisecta*.

*DRABA MONTANA*. Annual, hoary throughout with a rather dense villous pubescence: stem stout, simple or branched, leafy, 3 to 10 inches high: leaves rosulate at base, lanceolate, obtusish, entire or

sparingly toothed, 3 to 8 lines long: raceme many-flowered, elongated: flowers yellow, becoming whitish, small: pods erect on the short divaricate pedicels, elliptic-oblong, obtuse, pubescent, 4 lines long by a line broad: style none. — Rocky Mountains of Colorado; South Park, Wolf & Rothrock (n. 637); near Empire, E. L. Greene; also collected by Hall & Harbour. — *D. STENOLOBA*, Ledeb., is much more slender and less pubescent (nearly glabrous above), with narrower leaves, looser racemes, and narrower glabrous pods acutish at each end. — *D. NEMOROSA*, Linn., to which both have usually been referred and which is also frequent in the Rocky Mountains, is of lax spreading habit, with the ovate-oblong to lanceolate leaves rarely rosulate at base, pale yellow flowers, and the usually slightly pubescent pods (2 to 4 lines long) much shorter than the slender pedicels.

*THELYPODIUM AMBIGUUM*. A stout erect glabrous and glaucous branching biennial, 3 to 5 feet high: leaves sessile, broadly auricled, the lower oblanceolate, coarsely serrate, 6 to 8 inches long, the upper ovate to lanceolate, acute, mostly entire: flowers reddish purple, on spreading pedicels (3 or 4 lines long) in an open raceme; petals with an ovate-oblong blade and rather narrow claw, nearly twice longer than the oblong obtuse purplish sepals ( $2\frac{1}{2}$  lines long): pod elongated, narrow (3 inches long by less than a line broad), terete and subtorulose, recurved-spreading; stipe slender, nearly 2 lines long: stigma sessile, capitate. — Northern Arizona, Dr. Newberry on Lieut. Ives's Expedition (*Streptanthus sagittatus* of Ives's Report), and Dr. E. Palmer in 1877 (n. 27). Also n. 109, Watson, from Regan's Valley, N. Nevada, is apparently the same.

*VIOLA CUNEATA*. Glabrous: stem a span long, leafy, ascending from a short rootstock: leaves rhombic-ovate, acute, attenuate at base into a slender petiole, crenately toothed above: petals deep purple, more or less bordered or blotched with white, beardless, 4 lines long; spur very short, yellowish: capsule glabrous. — Humboldt County, California, on a high open ridge south of Trinity River; V. Rattan, June, 1878. Allied to *V. ocellata* and *V. Hallii*.

*SILENE SARGENTII*. Low and alpine (6 inches high), puberulent, cespitose and many-stemmed, with the habit of dwarf forms of *S. Douglasii*, to which it is allied: leaves linear, slightly oblanceolate, 1 to 2 inches long: flowers 3 to 6: calyx 6 or 7 lines long, cylindrical, with short teeth: petals about 10 lines long, the obovate bifid blade with a small tooth on each side; auricles broad, laciniately toothed; appendages large and broad, toothed: styles long-exserted: capsule narrowly cylindrical, long-stipitate: seeds minutely tuberculate on the

back. — On Table Mountain of the Monitor Range, N. Nevada, at 10,000 feet altitude; Prof. C. S. Sargent, 1878.

**SILENE GRAYII.** Low and alpine (3 to 6 inches high), cespitose, grayish-puberulent: leaves oblanceolate, 6 to 8 lines long: flowers 2 or 3: calyx broadly cylindric, with deep-rounded teeth, 5 or 6 lines long: petals rose-color, 7 or 8 lines long, the broad blade bifid to the middle with a prominent tooth on each side; claw broad with narrow entire auricles; appendages broad, entire or nearly so: capsule short, nearly sessile. — Mount Shasta, near snow; W. H. Brewer, 1862 (n. 1373); Hooker & Gray, 1877; A. S. Packard, Jr., 1877.

**PSORALEA CASTOREA.** Stems very short from a tuberous root, decumbent; the whole plant covered with white straight closely appressed rather rigid hairs: leaves digitately 3–5-foliolate, on stout petioles 2 or 3 inches long; leaflets cuneate-obovate, rounded or acutish at the apex, less pubescent above, an inch long; stipules ovate-lanceolate, scarious, persistent: peduncles shorter than the petioles: spike rather dense, about an inch long, with conspicuous foliaceous bracts as long as the calyx (4 or 5 lines), spatulate and abruptly acute: calyx-lobes linear, acuminate, nearly equalling the blue petals: pod thin, lanceolate, 5 lines long: seed compressed, nearly 2 lines long. — Near Beaver City, S. Utah, on sandy ridges; Dr. E. Palmer (n. 96, 1877). Belonging with the next to the *P. esculenta* group, and distinctly marked by the large foliaceous bracts.

**PSORALEA MEPHITICA.** A similar species, softly pubescent throughout and villous with more or less spreading hairs: leaflets 4 or 5, obtuse or retuse: stipules broadly ovate: peduncles about equalling the petioles: flowers on very short slender pedicels in a close raceme an inch long: bracts mostly scarious, ovate, acuminate or acute, rather shorter than the calyx (4 to 6 lines): calyx-lobes linear to oblong-lanceolate, lax, equalling the blue petals: pod small, somewhat chartaceous, villous above. — Same locality; Dr. E. Palmer (n. 97, 1877), who describes it as having the odor of the skunk.

**VICIA REVERCHONI.** Annual, pubescent with spreading hairs, the decumbent stem angled and narrowly winged, a foot high: leaflets 3 or 4 pairs on a broad rhachis, cuneate-oblong or the lower obovate, rounded or truncate and mucronate at the summit, 4 to 7 lines long: flowers solitary, small (3 lines long), light blue, the narrow acuminate calyx-teeth about equalling the tube: pod pubescent, shortly pedicellate on a peduncle an inch long or more, 10 to 15 lines long by 2 lines broad, 10–15-seeded. — On sandy prairies near Dallas, Texas; J. Reverchon, April, 1877.

**VICIA FLORIDANA.** Glabrous, with very slender elongated stems: leaflets 2 or 3 pairs, oblong-elliptic, cuneate at base, rounded and mucronate above, 5 to 10 lines long; stipules very small and narrow: peduncle 1-6- (usually 1-2-) flowered,  $\frac{1}{2}$  to 2 inches long: flowers small and pale (3 lines long), on very short pedicels; calyx-teeth broad, much shorter than the campanulate tube: pod glabrous, 1-2-seeded, shortly stipitate, acuminate,  $\frac{1}{2}$  inch long by 2 lines broad or more. — Florida, Buckley; upper St. John's River, W. M. Canby; rich woods near Jacksonville, and shell-islands at mouth of St. John's River, A. H. Curtiss. Apparently *V. acutifolia* var.  $\beta$ , Torr. & Gray, Flora, 1. 272; growing in large patches, and probably a perennial.

**BOLANDRA OREGANA.** Resembling *B. CALIFORNICA* in habit, but stouter (15 to 20 inches high) and more pubescent and glandular especially above: leaves laciniately toothed and lobed: flowers larger, the calyx-tube (about 3 lines long) equalling the teeth and a little shorter than the deep purple petals: pedicels reflexed in fruit: beaks of the ovary and capsule more attenuate: seeds dull, dark brown, a third of a line long. — On wet rocky banks of the Willamette River, near Oregon City, Oregon; J. Howell, June, 1877.

**SULLIVANTIA OREGANA.** Stoloniferous, slender, with the habit of *S. Ohioensis*, glandular above: leaves round-cordate, acutely and rather laciniately toothed, an inch in diameter or less: petals obtuse, oblong-obovate, a half longer than the sepals ( $1\frac{1}{2}$  lines long), somewhat crenate: seeds dark-brown and shining, narrowly winged, two thirds of a line long. — Discovered by the same collector in the same locality, and also on the rocky banks of the Columbia River. — *S. OHIOENSIS* has oblanceolate acutish petals, and smaller light-brown seeds with a thinner more distinct wing. It appears not to be stoloniferous.

**COTYLEDON PALMERI.** Caulescent: leaves not at all mealy or glaucous, reddish, lanceolate and acuminate (narrowing from the base to a very sharp point), 2 inches long by 8 or 9 lines wide at base, the margin obtuse: stem a span long, red, with scattered broadly triangular-ovate leaves, the lower more acuminate: inflorescence of a few simple spreading secund racemes, somewhat glaucous: pedicels 3 to 6 lines long: calyx rather broad, with triangular-ovate sepals 2 lines long: petals pale lemon-yellow, 5 or 6 lines long, scarcely carinate, the midvein not glaucous: carpels 4 lines long, at length somewhat spreading and with divergent styles. — San Simeon Bay, California; Dr. E. Palmer, 1877.

**COTYLEDON LINGULA.** Much like the last: leaves oblong, acute, 2 or 3 inches long by an inch broad: stems  $1\frac{1}{2}$  to 2 feet long, the branches of the cyme less spreading and short: pedicels very short (a line or less): sepals narrower and longer: carpels 3 lines long, somewhat spreading, with straight styles. — From the same region and collector. Described from living specimens, as also the last.

**CENOTHERA AMBIGUA.** Annual, with a short leafy stem and sending out naked horizontal branches from the base, the epidermis white and smooth: leaves oblanceolate, sinuately toothed or nearly entire, 3 or 4 inches long, with short appressed pubescence, as also the inflorescence: flowers nodding in the bud, white or cream-color becoming purplish; tips of the calyx free; petals 9 to 15 lines long: capsules linear, thickest toward the base, spreading or reflexed, an inch long or more: seeds linear, smooth, a line long. — Near St. George, S. Utah; Dr. E. Palmer (n. 162, 1877); also Dr. Parry in 1874, distributed as *C. albicaulis*, var. *decumbens*. It is closely allied to that species, but Dr. Palmer's specimens show it to be clearly distinct in habit, foliage and duration; the seed is also longer and narrower.

**LIGUSTICUM TENUIFOLIUM.** Stem slender, 12 to 18 inches high, naked above the base or with a single sessile leaf, and bearing a single naked umbel with rarely a lateral sterile one: leaves small (2 or 3 inches long), ternate and pinnately decompose, finely dissected with laciniately divided leaflets, the ultimate segments linear, a line or two long: rays few (7 to 11), an inch long or less: involucl of 1 or 2 narrowly linear bracts: fruit (scarcely mature) oblong, 2 lines long, narrowly ribbed, with narrow disk and conical styliophore: seed concavo-convex. — Mountains of Colorado; Hall & Harbour (n. 216, in part); Wolf & Rothrock, n. 721. Leaves much more finely divided even than in *L. filicinum*, and fruit very different.

**PEUCEDANUM GEYERI.** Low and acaulescent or nearly so, glabrous; root moniliform with 2 or 3 small globose tubers (a half-inch thick or less): leaves ternate-quinate, the leaflets linear, 4 to 9 lines long: flowers white, in small unequal-rayed umbels: involucl of several linear acuminate bracts: mature fruit unknown. — Collected by Geyer (n. 458), and on the Clear Water, Idaho, by Rev. Mr. Spalding, who gives the Indian name "Lakaptat." — **P. FARINOSUM,** Geyer, is a similar dwarf white-flowered species, having a solitary small globose tuber with frequent clusters of fine rootlets over its surface: fruit oblong-elliptic, 2 or 3 lines long, with numerous dorsal vittæ (3 or 4 in each interval) and 4 on the commissure. It ranges

from Wasington Territory to Idaho and N. California (Sierra County, J. G. Lemmon). There still remains some uncertainty respecting the other tuberous-rooted species which yield the "Biscuit-root" of the Indian tribes of Oregon. There seem to be two, both nearly acaulescent, with large somewhat fusiform tubers, linear leaflets, and white flowers, — one described by Spalding as "the famous Biscuit-root or 'Kamshit' (when dried, 'Kanash'), dug in large quantities in May," and the other somewhat taller, distinguished by him as "a large kind of Kamshit, the root not as good" as the other. Ripe fruit is unknown; the immature ovary indicates an oblong fruit with strong dorsal ribs.

**ASARUM LEMMONI.** Slender, somewhat pubescent, with elongated rootstocks: leaves cordate, rounded at the summit, thin and not mottled, glabrous above or nearly so: flowers rather small and mostly glabrous, with the short calyx-lobes (4 to 6 lines long) obtuse or only acute: connective but slightly produced beyond the anther: seeds narrowly ovate. — In the Sierra Nevada; Plumas and Sierra Counties, Mrs. R. M. Austin and J. G. Lemmon. Resembling *A. caudatum* of the Coast Ranges; distinguished especially by the more rounded leaves and short calyx-lobes.

**ABRONIA NANA.** Perennial, dwarf and cespitose, with a thick branching caudex: stems very short and leafy: leaves ovate (a half-inch long or less), rough-puberulent, with slender glandular-pubescent petioles an inch long: peduncles 2 or 3 inches long, glandular-pubescent: involucre of 4 or 5 ovate-oblong scarious bracts, reddish at base, 4 or 5 lines long: flowers greenish, 6 or 7 lines long, the reddish limb 4 lines broad: ovary turbinate, with 5 hollow wings: fruit unknown. — Near Beaver City, S. Utah, in dry ravines among junipers; Dr. E. Palmer (n. 404½, 1877).

**POLYGONUM (DURAVIA) BIDWELLÆ.** Low (2 to 4 inches high): leaves and bracts cuspidate, brownish: spikes short, dense: stipules conspicuous, white, scarious and chaff-like, often exceeding the bracts (2 lines long), 2-lobed, the lobes entire or slightly lacerate at the summit: flowers pale rose-color, nearly a line long: akene narrowly ovate, included; the styles widely divergent. — Near Chico, California; Mrs. John Bidwell, May, 1878. With the following species allied to *P. Californicum* and confirming the section *Duravia*, which is to be distinguished from *Avicularia* chiefly by the linear 3-nerved leaves and bracts, not jointed at the base, the solitary sessile spicate flowers, and the persistent styles. The original characters of the section as respects the fruit were drawn from immature specimens and are erroneous, the akene not differing essentially from that of

*Avicularia*. All the species are low slender erect and branching annuals. — *P. CALIFORNICUM*, Meisn., is somewhat taller, with longer narrower and looser spikes, short sheathing deeply lacerate stipules, shorter bracts scarcely equalling the slightly larger flowers, and a longer akene with but slightly divergent styles.

*POLYGONUM (DURAVIA) GREENEI*. Resembling *P. Californicum*, with denser spikes, the bracts and wholly fimbriate stipules 2 lines long: styles very short, somewhat spreading. — Plains of Shasta, Rev. E. L. Greene, 1876; near Chico, Mrs. J. Bidwell, July, 1878.

*POLYGONUM (PERSICARIA) MUHLENBERGII*. Perennial, in muddy or dry places, often 2 or 3 feet high, scabrous with short appressed or glandular hairs, especially upon the leaves and upper stem: leaves thin, rather broadly lanceolate, long-acuminate, usually rounded or cordate at base, 4 to 7 inches long, on short stout petioles ( $\frac{1}{2}$  to 1 inch long) from near the base of the naked sheath: flowers and fruit nearly as in *P. amphibium*, but spikes more elongated (1 to 3 inches long), often in pairs. — New England to Texas and westward to Washington Territory and N. California. *P. amphibium*, var. (?) *Muhlenbergii*, Meisn. in DC. Prodr. 14, 116, and including most of the var. *terrestre* of American botanists. Our subterrestrial form of *P. amphibium* seems rarely if ever to correspond to the var. *terrestre* of Europe.

*ERIOGONUM (EUERIOGONUM § FOLIOSA) PUBERULUM*. A low annual, dichotomously branching from near the base, appressed silky-puberulent throughout: leaves all radical, obovate, 3 or 4 lines broad: bracts foliaceous, mostly ternate, narrowly oblong, 2 lines long or less: involucre sessile in the forks, very small, 4-parted: flowers few, glabrous, rose-colored, about  $\frac{2}{3}$  of a line long: sepals oblong. — On Red Creek, S. Utah; Dr. E. Palmer (n. 429, 1877).

*ERIOGONUM (GANYSMA § PEDUNCULATA) HOOKERI*. Glabrous, a foot high or more; stem slender, not branching near the base as do the rest of the group: leaves densely floccose-tomentose both sides, orbicular: involucre campanulate, sessile or nearly so, reflexed and secund upon the branches: flowers pale yellow, the outer sepals subreniform-cordate, a line long; the inner oblong-ovate, half as long: akene abruptly beaked,  $\frac{1}{2}$  line long. — Wahsatch Mountains, American Fork Cañon (n. 1033 Watson, at least in part); W. Nevada, Hooker & Gray, 1877. Referred in King's Rep. 5. 306 to *E. deflexum*, which branches from the base, has more turbinate involucre, smaller flowers with narrower rose-colored sepals, and a more attenuate akene.

*ERIOGONUM INSIGNE*. Of the same group: becoming very stout and 2 or 3 feet high, glabrous excepting the reniform-cordate densely



white-tomentose radical leaves (an inch or two in diameter): involucre in the forks and secund on the short branches, large for the section (a line long or more), turbinate and somewhat angled, erect or nearly so on pedicels 1 to 3 lines long: flowers glabrous, rose-colored, becoming nearly a line long, the sepals oblong-ovate, subcordate at base: akene attenuate,  $\frac{3}{4}$  of a line long. — Near Red Creek, S. Utah; Dr. E. Palmer (n. 431, 1877).

**ERIOGONUM** (**OREGONIUM** § **CORYMBOSA**) **SULCATUM**. A woody very diffusely and intricately branched floccose-tomentose perennial, nearly glabrous above, the branches very strongly angled and sulcate: leaves narrowly oblanceolate, thin and lax, an inch long or less, silky-tomentose, less so above: bracts very small: involucre minute ( $\frac{1}{2}$  to  $\frac{3}{4}$  of a line long), sessile, glabrous. — Near St. George, S. Utah; Dr. E. Palmer (n. 432, 1877). Allied to *E. microthecum*; very distinctly marked by its angular branches.

**HOLLISTERIA**; new genus of *Eriogoneæ*. Involucre unilateral, of 3 equal slightly united linear herbaceous (not cuspidate) bracts, solitary and sessile in the axils, 2-flowered. Perianth turbinate, membranous, 6-cleft to the middle, the slender segments not rigid nor awned. Stamens 9, on the throat, included. Akene glabrous, triangular above. Embryo curved, the slender radicle accumbent to the orbicular cotyledons. — A small fragile leafy annual, diffusely branched from the base, white-woolly throughout; leaves apparently all alternate and foliaceous, but these each with a very small stipule-like pair at base, all cuspidate; flowers on short unequal pedicels, with a minute scarious bractlet at base. — A single species; the genus dedicated to Col. W. H. Hollister, of Santa Barbara, upon whose ranch it was found, and through whose aid and encouragement Mr. J. G. Lemmon made the collection in which it was detected.

**HOLLISTERIA LANATA**. Decumbent or prostrate, covered with a loose white woolly tomentum, which is less dense on the lower leaves: leaves oblanceolate, attenuate at base, the lower 1 to 3 inches long, the upper much shorter and narrowly ovate, aculeate-tipped; the stipule-like pair linear-subulate (1 to 3 lines long): perianth very woolly externally, a line long, the linear-lanceolate segments green with a scarious margin, the inner slightly shorter and broader: filaments filiform: styles slender: akene black, ovate with a stout triangular beak. — Near San Luis Obispo.

**SUÆDA INTERMEDIA**. Perennial, the straight erect slender herbaceous stems from a short woody base, 9 to 18 inches high, glabrous or sometimes puberulent; branchlets also slender, ascending: leaves

very narrowly linear with a contracted base, acute, 6 to 10 lines long, much shorter on the branches: fertile flowers very small, often solitary, the deeply cleft calyx unappendaged: seed very small ( $\frac{1}{3}$  of a line broad), horizontal, not at all tuberculate under the microscope. — Utah and Arizona; Dr. C. C. Parry (n. 218, S. Utah, 1874, and n. 84, Central Utah, 1875); L. F. Ward, on Powell's Survey (n. 152 and 718, 1875); also Hooker & Gray, 1878. Somewhat resembling *S. suffrutescens*, which is more shrubby and pubescent, with lax and flexuous stems, stouter and obtuser leaves, calyx less deeply lobed, and the usually vertical seed obscurely tuberculate.

**CELTIS BREVIPES.** A small tree (becoming 20 feet high and 18 inches in diameter), sparingly pubescent: leaves small (1 to  $1\frac{1}{2}$  inches long), entire, oblong-ovate, acuminate, rounded or cuneate at base, rather thin, finely but conspicuously reticulated, roughish above: fruit nearly 3 lines long, on slender pedicels about equalling the very slender petioles (2 lines long). — Near Camp Grant, Arizona; Dr. J. T. Rothrock (n. 367), on Lieut. Wheeler's Survey, 1874.

**CROTON (DREPADENIUM) TENUIS.** Perennial, woody at base, with slender decumbent stems a foot or two high: leaves narrowly oblong, a half to one inch long, with short petioles (1 to 4 lines): staminate flowers small and in small racemes: capsule 2 lines long: caruncle of the seed prominent, with a broad appressed lobed base. — S. California; Potrero, S. Diego County, D. Cleveland; Soda Lake, near Fort Mohave, Cooper. — **C. CALIFORNICUS**, Muell., differs in its less slender habit and broader leaves with longer petioles, and especially in its larger flowers and much larger capsules and seeds, the latter with a small appressed caruncle. It differs also both in habit and fruit from the allied *C. Neo-Mexicanus* of S. Utah and New Mexico, and the Mexican *C. gracilis*.

**STILLINGIA LINEARIFOLIA.** Perennial, branching from a woody base, the herbaceous slender terete ascending stems a foot high or more: leaves linear, entire or rarely slightly glandular-toothed, acute, sessile, 6 to 12 lines long: spikes terminal, very slender and open, 1 to  $1\frac{1}{2}$  inches long, with very small ovate acute 1-flowered bracts, minutely glandular on each side: staminate flowers with turbinate calyx, diandrous: pistillate flowers 2 to 7, scattered, without calyx: capsule  $1\frac{1}{2}$  lines long; horns of the gynophore rather thin, and central column often persistent: seed broadly ovate, acute, a line long, smooth, without caruncle. — S. California; near Boundary Monument, San Diego, Dr. E. Palmer (n. 449, 1875); San Bernardino, Parry & Lemmon (n. 376, 1876). Referable, with the following

species, to Mueller's *Gymnostillingia*, which may be considered a section or subgenus, characterized by solitary staminate flowers, the pistillate ones naked, and the seed without caruncle.

**STILLINGIA PAUCIDENTATA.** Differing from the last in its stout angled stems branching above; leaves acuminate, an inch or two long, with 2 or 3 setaceous teeth on each side near the base; spikes stouter and denser, the pistillate flowers more crowded; capsule larger, with more prominent gynophore, and the larger seed oblong-ovate, slightly carunculate. — Colorado Valley, near mouth of Williams River; Dr. E. Palmer (n. 517, 1876).

**STILLINGIA TORREYANA.** A low glabrous annual (?), with angled leafy stems: leaves oblong-obovate, cuneate at base, rounded above, obscurely veined, acutely and sometimes doubly toothed, 6 to 10 lines long, with minute fimbriate caducous stipules: spikes terminal, sessile, short and slender: bracts very small, ovate, acute, 1-flowered, with nearly sessile disk-like glands: staminate calyx campanulate, diandrous, the pistillate of 3 triangular sepals: capsule over 2 lines broad, with stout gynophore: seeds oblong-ovoid,  $1\frac{1}{2}$  lines long, smooth, with conspicuous prominent caruncle. — Valley of the Rio Grande, at Eagle Pass; Dr. Bigelow, 1852. *Sapium annuum*, var. *dentatum*, Torr. in Bot. Mex. Bound. 201, and referred doubtfully by Mueller to *Sebastiania Treculiana*. The latter, from the same region and much resembling the present species, is distinct though doubtless a congener. It is described as a perennial, 1 to  $1\frac{1}{2}$  feet high, with a woody base. Its leaves are oblanceolate, acutish, 10 to 15 lines long; the capsule somewhat smaller, with a short stout-horned gynophore and large persistent central column; the seed smaller, subglobose, irregularly tuberculate, and with much smaller caruncle.

**CALLITRICHE SEPULTA.** Terrestrial, prostrate and rooting, with numerous narrowly linear leaves 2 or 3 lines long: bracts none: fruit broader than long, emarginate at each end, the thick carpels with acute divergent margins, on stout pedicels a line or two long, soon deflexed and buried in the soil: styles elongated, reflexed, soon deciduous. — Oregon; E. Hall (n. 459). Allied to *C. deflexa*, A. Braun (*C. Austini*, Engelm.), and to *C. Nuttallii*, Torr., of which the latter has the same habit of burying its fruit.

**EPHEDRA NEVADENSIS.** An erect shrub, 2 feet high or more, with opposite erect or somewhat diffusely spreading branches; bark splitting and becoming white and shreddy or fibrous: scales opposite, sheathing, with short acute lobes or somewhat elongated foliaceous tips, usually 1 to 3 lines long, at length mostly deciduous: staminate

aments sessile or nearly so, of 4 to 6 pairs of connate bracts: filaments long-exserted, united throughout or the anthers (4 to 8) shortly stipitate: fertile flowers upon a scaly-bracted (rarely naked) peduncle 1 to 6 lines long; bracts 4 or 5 pairs, round-ovate, connate: fruit solitary or in pairs, 3 or rarely 4 lines long, exserted, acutish, smooth; micropyle a line long. — *E. antisiphilitica*, Watson, Bot. King. Exp. 328, t. 39. Throughout the interior from N. Nevada to the Colorado Desert (Fort Mohave, Cooper), Northern Mexico (Gregg), and the Rio Grande. The New Mexican form has more usually very short peduncles and solitary fruit. Californian specimens collected at Fort Tejon (n. 112, Xantus) and in the Santa Inez Mountains (n. 347, Brewer), without flowers or fruit, are peculiar in having persistent scales and may possibly prove distinct.

*EPHEDRA*<sup>1</sup> *TORREYANA*. Erect, 1 to 3 feet high or more, the branches often somewhat flexuous, not spinose, usually ternate: scales short (a line or two long), sheathing, ternate, with broad and acutish or rarely narrow lobes, subpersistent, not becoming shreddy: staminate

<sup>1</sup> The North American species of this genus may be defined as follows: —

\* Scales 2-lobed and the branches (not spinose) opposite: bracts in pairs and evidently connate, scarcely at all scarious: fruit solitary or in pairs, smooth.

1. *E. ANTISYPHILITICA*, C. A. Meyer. Stems mostly lax and slender, decumbent and nearly prostrate or supported on shrubs or trees to a height of 8 or 10 feet; bark not shreddy nor fibrous: scales distinct, subpersistent, very short and triangular-ovate, or when young setaceously tipped and slightly sheathing (sometimes 2 lines long): aments on short bracteate peduncles: filaments distinct above the perianth: fertile flowers with 3 or 4 pairs of bracts: fruit  $2\frac{1}{2}$  or 3 lines long: otherwise as the next, but micropyle slightly shorter. — W. Texas and New Mexico (n. 320, 1590, Berlandier; n. 673, 1881, Wright; n. 225, 273, 428, Lindheimer), to Northern Mexico (n. 855, Parry & Palmer, 1878).

2. *E. NEVADENSIS*, Watson. See above.

\*\* Scales ternate and branches mostly in threes: bracts ternate, distinct or slightly connate, those of the fertile flowers more or less conspicuously scarious and unguiculate: fruit solitary or in threes.

3. *E. TRIFURCA*, Torr. Erect, much branched, 2 to 6 feet high, the straight rigid branches spinosely tipped: scales conspicuous, sheathing, 3 to 6 lines long, sharply acuminate, persistent, becoming whitish and shreddy: staminate aments on a very short peduncle, of 5 whorls of ovate bracts about equalling the cuneate-oblong perianths: anthers (4 or 5) stipitate: fertile flowers nearly sessile, 5 or 6 lines long, of numerous whorls (8 to 10) of very thin and scarious entire round-cordate unguiculate bracts: fruit solitary, 6 lines long, 4-sided, attenuate upward, smooth: micropyle  $2\frac{1}{2}$  lines long. — Arizona and New Mexico; Mohave Agency, Dr. E. Palmer (n. 523 $\frac{1}{2}$ , 1876); near El Paso, Dr. Bigelow; near Fronteras, Wright (n. 1884).

4. *E. TORREYANA*, Watson; and 5. *E. CALIFORNICA*, Watson. See above.

aments nearly sessile, of 6 to 8 whorls of broad bracts; perianth round-ovate, slightly exserted; anthers 5 to 8, stipitate: fertile flowers 3 to 5 lines long, on a very short peduncle, of 5 or 6 whorls of thin broadly dilated unguiculate more or less crenulate bracts: fruit solitary or in threes, oblong-lanceolate, scabrous, 4 lines long or less: micro-pyle a line or two long.—New Mexico to S. Utah; Fronteras (n. 1883, Wright); El Paso (Bigelow); Santa Fé (n. 80, Rothrock); S. Utah (n. 250, Parry, 1874).

**EPHEDRA CALIFORNICA.** Stems ascending or decumbent, the ternate branches not spinose: scales in threes, sheathing but soon splitting to the base and recurved,  $1\frac{1}{2}$  to 3 lines long, the oblong acutish lobes long-persistent, becoming dark-colored: staminate aments globose, sessile, of 4 whorls of nearly distinct bracts; perianth broad, included; anthers 4 or 5, sessile: fertile flowers sessile, of 4 or 5 whorls of rather rigid scarious reniform-orbicular sessile bracts, the upper with a broad and very short claw: fruit solitary, ovate, somewhat 4-angled, acutish, smooth, 3 to  $3\frac{1}{2}$  lines long.—San Diego County, California; promontory near San Diego and Jamul Valley, Dr. E. Palmer (n. 364 and 365, 1875).

**CUPRESSUS GUADALUPENSIS.** A widely spreading tree, becoming 40 feet high or more, and 2 to 5 feet in diameter, with grayish-brown bark cleaving off in thin plates and leaving the thin inner bark with a smooth claret-red surface: branches drooping and branchlets very slender: foliage glaucous-green, the acute or acutish leaves very obscurely glandular on the back: cones globose, an inch or more in diameter, of 6 or 8 very thick and strongly bossed scales: seeds numerous, large (3 lines long or more).—On Guadalupe Island, off the coast of Lower California; distributed as *C. macrocarpa* in Dr. E. Palmer's collection from that island. In cultivation about San Francisco, and likely to prove very valuable for ornamental purposes.

**ZEPHYRANTHES TREATLÆ.** Bulb small (a half-inch in diameter): leaves thick, semi-terete with rounded margins, very narrow (rarely  $1\frac{1}{2}$  lines wide), deep green and not shining: scape 4 to 12 inches high: spathe in the fresh flower closely sheathing the ovary and stout peduncle: flower 3 inches long, white becoming pinkish; segments obtusish: anthers short,  $1\frac{1}{2}$  to 3 lines long: capsule broader than long (5 or 6 lines), on a peduncle 3 to 9 lines long.—In wet or moist places, Florida; near Green Cove Springs, Mrs. Mary Treat; on the St. John's River, near Jacksonville, Dr. E. Palmer and A. H. Curtiss. Distributed as *Amaryllis Atamasco* in the collections of the latter. It

flowers in April and May. — *Z. ATAMASCO*, Herb., growing in the same region and northward, but in drier localities and blooming several weeks earlier, has thin channelled leaves with acute margins, bright green and shining,  $1\frac{1}{2}$  to  $2\frac{1}{2}$  lines wide, a loose spathe, the flower with a more slender tube and peduncle, rather broader and more acute segments, and anthers 3 or 4 lines long. The most obvious distinction is found in the foliage.

*HYMENOCALLIS PALMERI*. Bulb small (4 or 5 lines thick), narrowly oblong, with thick roots: leaves with short sheaths, very narrow, a foot long by 3 lines wide or less: scape slender, 8 or 10 inches high, 1-flowered: spathe-segments 3, narrowly linear: perianth-tube scarcely dilated above, about equalling the narrow (a line wide) segments, which are  $3\frac{1}{2}$  or 4 inches long: crown tubular-funnelform, 15 lines long, the border acuminate lobed between the stamens: filaments a third shorter than the perianth; anthers greenish: ovary oblong-ovate, 9 lines long. — Biscayan Bay, Florida, Dr. E. Palmer (n. 554, 1874).

*HYMENOCALLIS HUMILIS*. Bulb twice larger, upon a thick root-stock: leaves with broad sheathing bases, 4 to 6 inches long by 2 lines broad: scape slender, scarcely equalling the leaves, 1-flowered: spathe-segments 3, greenish, narrowly linear: flowers greenish; tube scarcely dilated above, 15 lines long, shorter than the narrow segments (2 inches long); crown broadly funnelform, 8 lines long, truncate between the stamens: filaments a third shorter than the perianth and style: anthers greenish: ovary narrowly oblong, 5 lines long, becoming an inch long in fruit. — Indian River, Florida; Dr. E. Palmer (n. 555, 1874). Though our species of this genus cannot be said to be well known, yet it seems to be safe to propose the above as new species, differing so markedly as they do from any previously described. Of the species of *Pancratium* given in Chapman's Flora, there can be little doubt that neither *P. maritimum* nor *P. nutans* will be found within our limits. The original *P. Carolinianum* of Linnæus (founded on Catesby's figure) was probably *Hymenocallis rotata*, and all later figures and descriptions of "*P. Carolinianum*" were based upon the foreign *P. maritimum*. It is probable that *Pancratium*, as now understood, and *Ismene* are not represented in our flora.

*BRODLÆA HOWELLII*. Resembling large forms of *B. lactea*: stem nearly 2 feet high: flowers larger (9 or 10 lines long and about equalling the pedicels), purplish, turbinate-campanulate, the tube somewhat longer than the lobes: outer filaments short and deltoid; the inner longer, broadly winged the whole length, the wing truncate or

rounded above; anthers 2 lines long: capsule long-stipitate, oblong, attenuate upward; cells about 6-seeded. — Klickitat County, Washington Territory; Joseph Howell, June, 1879.

**LILIUM GRAYI.** See page 256. Since the preceding pages were in type, flowering specimens of this species have come to hand, collected (June 20) on the sides of Roan Mountain by Dr. Gray and Prof. C. S. Sargent. These show a nearer approach in some respects to *L. Canadense*, the leaves being narrower than in the original specimens and the flowers (1 to 3) are somewhat nodding, but still less decidedly pendent when open than is the usual habit of *L. Canadense*. The flowers are smaller ( $1\frac{1}{2}$  to 2 inches long), but broader at base, the segments broader in proportion to the length and more abruptly contracted into the terminal cusp, deeply colored and but slightly spreading. The root is similar to that of *L. Canadense* and *L. superbum*.

**LUZULA CAROLINÆ.** Very slightly villous: stem a foot high or more, with broad flat leaves and a foliaceous bract exceeding the diffuse and lax cyme: flowers solitary on slender pedicels: anthers linear, about equalling the filaments: capsule with narrowly ovate valves,  $1\frac{1}{2}$  lines long, a little longer than the light-brown perianth: seed brown, subglobose, with a narrow whitish somewhat wing-like rhaphe. — On Grandfather Mountain in North Carolina; Gray and Carey, July, 1841. Differing from *L. pilosa* in its smoothness, the conspicuous bract, narrower capsule, and smaller seed without the prominent terminal twisted appendage.

**LUZULA DIVARICATA.** Usually low (6 inches high or less), and resembling *L. spadiacea*, var. *parviflora*, except that the cyme is broadly diffuse with divaricately spreading branches and pedicels, and the seed is light-colored with a small appendage at base. — In the Sierra Nevada, mostly alpine, from above Mono Lake to Sierra County; W. H. Brewer (n. 1794, 2069, 2334), Rev. E. L. Greene, and J. G. Lemmon.

**JUNCUS ROBUSTUS.** Terete scape and leaves 2 to 5 feet high, very stout, rigid and pungent; the sheathing bases narrowed gradually above: lateral panicle compound with very unequal branches, erect and strict, usually 3 to 6 inches long and about equalling the scape; spathes and bracts long-acuminate, equalling or exceeding the flowers: clusters 2-4-flowered: outer perianth-segments broadly lanceolate, acute, the inner obovate and deeply emarginate, a line long: capsule subglobose, narrowed below, rounded at the summit, apiculate, brown, nearly 2 lines long: seeds acute at each end or slightly caudate, very finely ribbed, about a half-line long. — *J. acutus*, Engelm. Proc. St.

Louis Acad. 2. 438. *J. acutus*, var. *sphærocarpus*, Engelm. in Wheeler's Rep. 6. 376. Southern California, frequent in marshes in the Coast Ranges from San Francisco to San Diego. *J. acutus* of the Old World has a shorter and more spreading panicle, shorter spathes and bracts, a more triangular and more acute capsule, and usually more distinctly caudate seeds: the sheaths at the base are also more abruptly contracted. The tough scapes of the present species are split by the Indians and used in binding together the material of their baskets.

**JUNCUS (ARTICULATI) NEVADENSIS.** Scape very slender from a slender horizontal rootstock, somewhat compressed,  $\frac{1}{2}$  to 2 feet high: leaves very narrow (rarely a line wide), subterete; ligules present: spathe short and very narrow: heads small, few to rather many in a short open panicle, frequently solitary: perianth-segments brownish, lanceolate, acuminate, 2 lines long: stamens 6; anthers longer than the filaments: stigmas long-exserted: capsule oblong, abruptly contracted into the stout style, which nearly equals the perianth: seeds minute, oblong, apiculate at each end. — *J. phæocephalus*, var. *gracilis*, Engelm. Proc. St. Louis Acad. 2. 473. Frequent in the Sierra Nevada, from Kern County (Rothrock) to Oregon. Resembling *J. articulatus* in habit, but much more slender; distinguished from *J. phæocephalus* by its slender habit, subterete scape and leaves, ligules, smaller heads, more abruptly acute capsule, and much smaller and narrower seeds.

**PHYLLOSPADIX TORREYI.** Stem and leaves much elongated, scarcely a line wide, the latter flat, faintly 1-nerved, with sheaths 2 to 10 inches long: spathes 2 to 6, near the summit of an elongated peduncle, the dilated portion  $1\frac{1}{2}$  or 2 inches long, foliaceous above: spadix enclosed,  $1\frac{1}{2}$  lines wide, with 15 to 20 ovate-oblong acute appendages within the margin and above the attachment of the corresponding ovaries,  $2\frac{1}{2}$  to 3 lines long: ovaries cordate-sagittate, somewhat flattened dorsally and carinate,  $2\frac{1}{2}$  lines long; stigmas half as long: fruit unknown. — Collected by Dr. Torrey at Santa Barbara, in flower. It is apparently the same that is described and figured by Ruprecht under the name of *P. Scouleri* (Mém. Acad. Petersb. 7. 58, t. 1 and 2, f. 5-16), from the mouth of Russian River, though represented with short peduncles, a single spathe and broader leaves. *P. Scouleri*, Hook. Fl. Bor.-Am. 2. 171, t. 186, may be distinguished by its ovate-oblong ovaries, rounded at base; its mature fruit is also unknown.